

TRS-80
COLOR
COMPUTER

Starting A Series...

THE COLOR COMPUTER PREDICTS THE NFL!

JUNE, 1982

\$2.50

the RAINBOW

The Monthly Magazine for Color Computer Users

Vol. I No. 12

Under the RAINBOW

Swamp and Ice Games
Using SPECTACULATOR
Printer Mysteries
Reviews

More from PMODE4
Computer Star Map
Hints, Tips, Tutorials
And...MUCH MORE!!

Special Utility...
A Universal Data Base

PLUS...

Assembly Language Column
Fantasy Game Aids

Editor's Notes...

PRINT #-2,

This issue completes one whole year of publishing the RAINBOW.

We won't go into a lot about it all this time out, because we consider our July issue to be the "official" anniversary issue. While you will see some changes in this month's edition, we hope and are now planning for some more next month. All we can say is watch for them. We hope you will be pleased.

You read here last month about

some preliminary plans for the RAINBOW's new Seal of Certification. Those plans are coming into being now, and we call your attention to the inside of this month's issue, where full details are given. We have received a great deal of good comment from you, our subscribers, and from many of the vendors too, about the Seal program. We hope you will take a moment or two out to look at the article about the Seal. The entire program was

(Continued on Page 3)

- 12 80C PICKS THE NATIONAL FOOTBALL LEAGUE.....John Waclo
*First in a series in which you will be able to use your 80C
to predict the outcome of this year's games.*
- 21 PRINTER FEATURES EXPLAINED.....Lawrence C. Falk
Some of the bigger mysteries made simple.
- 25 ICE LANDER.....Ted Shorter
A 13-year-old's lunar lander-like game.
- 28 THE RAINBOW SEAL OF CERTIFICATION.....Staff
Details of this new consumer protection program.
- 31 SPECTACULATOR AS CHECKBOOK-KEEPER.....Dick White
The way to make this program work on your finances, quickly and easily.
- 42 GETTING MORE OUT OF PMODE 4.....H. Allen Curtis
Yes, Virginia, there are more colors in the highest resolution.
- 49 SWAMP WARS.....Fred Scerbo, Robert Doppert & Dale Haggerty
Win your Croix de Lillypad in this game.
- 57 UNIVERSAL DATA FILE.....Jorge Mir
You are going to get organized!
- 58 STAR CHART.....Ray Moses
A heavenly program.

R E V I E W S

Auto Run.....52
Blackjak.....66
Biorhythm.....52
Compuvoice.....11
Date-O-Base
 Calendar..... 9
Disk Doctor.....23
Football!.....23
LCA-47.....62

Lowerkit.....62
Newtalk.....11
Paper Porter....54
Red Baron.....17
Sisi.....23
The Solution.... 8
Soundsource.....11
Space Invaders.. 8
Venturer.....40

-- DEPARTMENTS

- Assembly Corner..... 6
Dennis Lewandowski
- Back Issue Information.....29
- Fantasy Games.....38
Bill Nolen
- Letters To RAINBOW..... 4
- Pipeline.....36
- PRINT #-2..... 1
Editor's Notes
- Submission Guidelines.....33

the RAINBOW
PUBLISHED BY FALSOFT, INC.
5803 Timber Ridge Drive
Prospect, KY 40059

Entire Contents © by FALSOFT, INC., 1982
LAWRENCE C. FALK — Editor

The RAINBOW is intended for the personal use and pleasure of its subscribers and reproduction by any means is forbidden. Use of programs and information herein is for the single end use of purchasers and any other use is prohibited.

TRS-80, Color Computer and Extended Color Basic are trademarks of Tandy Corp.
All programs herein are distributed on an 'as is' basis, without warranty as to suitability for any purpose.

Subscriptions to the RAINBOW are \$16 per year in the United States. Canadian and Mexican rates are \$22 per year. Surface mail to other countries is \$31, air mail to other countries is \$49. Non-U.S. rates are higher due to postage costs alone.

Limited back issues are available for \$2 each for issues 1-7, \$2.50 each for issues 8 and upward. Shipping and handling costs of \$2.50 per order must be added.

Payment accepted by cash, check, money order, VISA or MasterCard in U.S. funds. Please include account number, expiration date and your signature when using bank cards.

The RAINBOW is published every month of the year.

PRINT #-2

(From Page 1)

designed with you in mind.

While on the general subject of advertising, we do want to again encourage you to let our advertisers know you "saw it in the RAINBOW." Our first edition was four photocopied pages. This month's is well over 60. The plain truth is that growth of that sort -- and the ability to deliver more information to you on time every month -- is dependent on advertising. We can continue to grow, and to provide you with more information, only as our advertising grows. So, do patronize our advertisers -- and be sure to tell them where you read about it. We admit that helps us, but it helps you, too.

Big news! As part of the special Adventure edition we are preparing for the fall, we will have an Adventure Contest. First prize is guaranteed to be no less than \$100 (we're still working out prize details).

In order to be eligible for the contest, you must write an Adventure game, submit it on tape or disk, and it must be received no later than September 1. All programs become the property of the RAINBOW, of course, and the winning Adventure will be published in the RAINBOW, along with information about who the winner is.

Do not submit any Adventure that is commercially available. And, there will be several prizes, so you don't have to win it all to get something out of this. As we mentioned, there will be further details on the prizes later.

In the meantime, watch for some help in writing Adventures. But remember, the program has to be an original creation of your own (no adaptations) and you will be disqualified if we get an error message of any kind while running the program. So debug your submission thoroughly.

The Adventure you submit may be word-oriented or graphic-oriented (or a combination of both). It can have any theme and must, of course, be written for the 80C. Also, when making your submission, be sure to include your name, address and phone (we have to know where to send the prize) and tell us how big a system is required to run the program. Please supply instructions and a hard copy listing as well.

Finally, we want to emphasize two things again. First of all, we welcome your letters -- be they of

praise or criticism. We want to continue to put out the finest computer magazine available and we can only do that if we are responsive to what you want. And we do listen. The little boxes which appear in this issue for the first time with system requirements for programs are the result of reader requests. So is the Table of Contents which first appeared last month.

Second, please remember the RAINBOW is dedicated to the betterment of the 80C. One of the things we think helps a lot are Color Computer Clubs or Special Interest groups. We'll be most pleased to give information on how other 80C owners can contact a club if you will just ask us to do so in writing.

Last but not least. Since summertime is a "moving experience" for many of you, please be sure to inform us well in advance of your new address, including ZIP code. We'll make the change as quickly as possible, but if you delay, you may miss an issue. The Postal Service will not forward bulk rate mail.

FREE GAME --- BREAK OUT

SEND A S.A.S.E. FOR A FREE LISTING OF THIS PROGRAM. WRITTEN IN MACHINE LANGUAGE. VERY FAST, HAS ON SCREEN SCORING, ETC. NEEDS JOYSTICKS. COMES WITH COMPLETE INSTRUCTIONS ON HOW TO ENTER IT AND RUN THE GAME.

THE SOLUTION --- \$12.95

THE SOLUTION SOLVES THE PROBLEM OF THE COLOR COMPUTER'S SMALL SCREEN SIZE. FEATURES INCLUDE:

- 1- FULL ASCII CHARACTER SET
- 2- LOWER CASE CHARACTERS WITH DECENDERS
- 3- 42 CHARACTERS X 21 LINES DISPLAYED
- 4- USER MAY HAVE TEXT AND GRAPHICS AT THE SAME TIME
- 5- INTERFACES DIRECTLY WITH BASIC
- 6- FAST-PRINTS AT OVER 500 CHARACTERS PER SECOND

WRITTEN IN MACHINE LANGUAGE. CAN BE SETUP ANYWHERE IN MEMORY. THE PROGRAM CAN BE SETUP TO PROVIDE 4 LINES OF TEXT AT THE BOTTOM OF A GRAPHIC SCREEN.

GRAPH LABEL --- \$8.95

ALLOWS THE USER TO PLACE CHARACTERS ANY ON A GRAPHIC SCREEN. CAN BE USED TO LABEL HIGH RES. GRAPHICS. FULL CURSOR CONTROL. MOVE CURSOR ONE CHARACTER BLOCK OR ONE PIXEL AT A TIME. HAS FULL ASCII CHARACTER SET (5x8 DOT MATRIX), SUBSCRIPTS AND SUPERSUBSCRIPTS, AND USER DEFINED CHARACTERS. CAN BE USED AS A SUBROUTINE OR STAND ALONE, WORKS WITH ALL 2 COLOR GRAPHIC MODES.

C.C. PILOT --- \$5.95

IMPLEMENTATION OF PILOT FOR C.C. HAS STANDARD PILOT INSTRUCTION WITH EXTENSIONS FOR C.C. INCLUDES TEXT EDITOR AND INTERPRETOR IN ONE PACKAGE. COMES WITH MANUAL AND DEMO PROGRAMS. *N-16K-ALL BASICS

SUPER PILOT --- \$9.95

PILOT FOR EXTENDED BASIC. MANY NEW FEATURES FOR GRAPHICS AND SOUND. PSEUDO COMPILED FOR FASTER PROGRAM EXECUTION. MANUAL & DEMO PROGRAMS

ART EDITOR --- \$9.95 --- POOR MAN'S VERSION OF SHACK'S "ART GALLERY".

DOUBLE SIZE SCREEN PRINT --- \$3.95 --- CREATES A SCREEN PRINT 6.4 X 8.1 INCHES. MUCH NICER THAN RADIO SHACK'S PROGRAMLP-VII OR VIII REQ.)

FAST GRAPHICS PACKAGE --- \$4.95 --- A MACHINE LANGUAGE PROGRAM THAT EXECUTES WITH TWICE THE SPEED OF EXTENDED BASIC. HAS LINE DRAWING PIXEL SETTING, AND SCREEN CLEAR ROUTINES. RUNS ON ALL MACHINES. GIVES 4K USERS A 128X64 GRAPHIC DISPLAY.

CALL PROGRAMS FOR 16K-EXTENDED BASIC UNLESS OTHERWISE NOTED

SHAKE MOUNTAIN SOFTWARE
P.O. BOX 3722
RALEIGH, NC 27650

TERMS-CHECK OR MONEY ORDER ONLY. INCLUDE \$1.00 FOR ONE PROGRAM, \$2.00 FOR MORE THAN ONE PROGRAM FOR SHIPPING.

LETTERS TO

RAINBOW

MESSSED UP LETTER

Editor:

You published my letter in the April RAINBOW under the heading "More Random Thoughts." However, there is a typographical error in line 40. As published it reads "40 IF A<1 THEN GOTO 30". It should read "40 IF A<2 THEN GOTO 30". It makes no sense the way it was published.

Rita Lawry
Cleveland, OH

PLEASED

Editor:

Firstly, let me say I enjoy your publication very much. It would like to see more programs in it for non-technical users like myself who don't have printers, disk drives and just want to play.

I would like to tell you about one of your advertisers, Spectral Associates of Tacoma, WA. A while ago, I wanted to upgrade my 16K to 32K so I bought their "Ramcharger." When I received the board, I followed their simple instructions carefully, but the board would not seat right in my 80C.

I talked to the technicians at Spectral and, though they were very helpful, I still could not get the board to seat because of one of the components of my machine. Apparently when my machine was put together, the component was installed abnormally higher and, through no fault of Spectral's, the Ramcharger would not work.

With all the disclaimers associated with the software and hardware industry, I expected I would either have to take the computer to the Radio Shack service people to have the problem corrected at my expense or give up the idea of installing my own upgrade. I sent the board back to Spectral explaining the problem, and four days after I mailed it to them I received back another board designed and built expressly for my particular computer.

I easily installed the board and it works perfectly. In my opinion Spectral went far above and beyond in dealing with my dilemma and I would like to commend them and recommend them to your readers.

Bob Symonds
Manchester, CT

CLUBS

Editor:

We are a new club whose primary interest is the 80C. We are just getting started.

Anyone interested can contact Andrew Thomas, 2804 E. 55th Place, Suite Q, Indianapolis, IN, 46220.

Andrew Thomas
Indianapolis

Editor:

We have started an 80C group here in Indianapolis with about 15 members. Those interested can contact Robert Carr, 1937 N. Emerson Ave., Indianapolis, IN, 46218.

Robert Carr
Indianapolis

Editor:

We are starting a Color Computer Club in Columbus, OH. So far, we have about 20 people who are interested. Surely there must be more people in the central Ohio area who have or are interested in purchasing an 80C. Anyone interested can call Susan Davis at (614) 861-0565.

Thank you for passing along this information.

Susan Davis
Reynoldsburg, OH

MX-80 GRAPHICS

Editor:

I too, like George Klement of Grandview, MO, have a 32K Extended 80C using Computerware's upgrade kit and an Epson MX-80. I am finally able to print graphics.

I am interfacing the Epson with MicroWorks' PI80C. I have an older 80C with the 1.0 ROM. After spending considerable amounts of money for all this hardware, I thought I could hook it all up and get it to work.

After many phone calls, and genuine interest from the people at Micro Works, I found out what was needed to make it happen.

First of all, the Radio Shack Screen Print program does not enter the picture. One does need the PTFX16 program that Radio Shack supplies for free, and a special driver program that was supplied, in this case, by Micro Works. First you CLOADM the PTFX, the CLOAD the driver routine (it is in BASIC) and then

create your graphics program before the driver. Voila! Graphics to the printer.

Also, I agree with Glenn Knight, Glen Burney and Jim Rauh about the content of articles and advertising. There may be some wizards out there too, but it is the user who is the focal point of software and hardware support.

Finally, Norman Place of Florida: I'll be right behind you ordering a good music composer program if, indeed, someone invents one.

The truth of the matter is I am thrilled with the progress that 80C supporters have made in the last year and my complements to the RAINBOW for doing such a wonderful job.

Bob Safir
Los Angeles, CA

GENERAL HELP

Editor:

Its not completely clear to me what Edgar Poulin is asking for, but he can set the printer width by POKEing the number of columns into 155. Perhaps he was the victim of the typo in the Extended Basic manual where it says 115. If he wants something else, he can get in touch with me at 291 South Main St., Andover, MA, 01810.

Likewise, I am not sure exactly what Ralph Coleman is referring to. If he can't get the sample programs on page 162 to run, either he is doing something fundamentally wrong or he has a defective ROM. Two minutes with a Radio Shack salesman should resolve which. If he is trying to get assembly code to run, he could have a plethora of problems. The most likely is he is zapping a machine register used by BASIC. My recommendation is he start his code by pushing everything but the program counter to the stack (PSHS U, X, Y, DP, B, A, CC) and exit by pulling everything (including the program counter, PC) from the stack.

In reference to SPECTACULATOR, I agree it is super, but I'm discovering some design peculiarities. Among those I find most irksome are lack of tape positioning capability, the fact that the formatting capabilities are not a little more sophisticated and the way formulas are handled. Overall, except for

tape positioning, I think it is a well thought out and well implemented product that is very useful.

Don Kenney
Andover, MA

(EDITOR'S NOTE: See the special article on SPECTACULATOR by Dick White in this month's issue. More of these are forthcoming.)

COLORFUL SCREEN

Editor:

Do you hate looking at the same old green screen of the 80C?

Have you noticed that when you use the SCREEN command that, unless you use it in a program, the screen it produces only blinks on?

Try this yourself: Type in SCREEN 0,1. See that the screen stays pink for only a split second. Well, I did some messing around with POKEs and found that if you POKE 359,13 and then use screen commands like SCREEN 0,1 the screen produced is permanent (unless you press RESET or do the remedy POKE, POKE 359,126).

A lot of people think they know the best way to PCLEAR0. I am one of those people. The best, shortest and easiest way is POKE 25,6:POKE 31,6. It does not clear the program from memory. Location 26 (and 26) contain the location of the beginning of the BASIC program and location 31 is the same, except it is used for the NEW command.

Roger Cauvin
Austin, TX

SECRET PROGRAM

Editor:

I came up with a "secret program" routine. Its fun. You can have hidden lines or make a listing appear what it isn't.

Try this:

10 FOR Y=100 TO 110: followed by 19 asterisks and then 10 FOR X=1 TO 8
20 SOUND Y,10: followed by 14 asterisks and then 20 CLS(X)

30 NEXT

1 D=256:peek(25)

2 FOR Y=D TO D+200

3 IF PEEK(Y)=42 THEN POKE Y,8

4 NEXT:DEL -5

When run, 80C starts before the program and checks for asterisks. It replaces each with a backspace (ASCII 8). Although it runs a sound program, a listing shows a clear screen in eight colors.

Mr. Poster

S. Hackensack, NJ

PROGRAM CHANGE

Editor:

Thank you for the review of our program, *NOKEY NINDER II* in the

April issue. And thank you for a really excellent magazine.

Because of the review, we have re-written the documentation for *NOKEY NINDER II*. We have also made a couple of changes to the program which allow greater operator convenience.

Jay Hoggins, Harmonycs
Salt Lake City, UT

SOUND ADVICE

Editor:

My first *RAINBOW* arrived today. I love it. Its so nice not having to check everything before I read it (to throw out the bad apples, if you know what I mean). Just don't forget about us poor relations struggling along with 4K.

Thanks to Cameron Price for his AUDIO ON advice for CSaving a program. I lost a lunar lander program by forgetting to push record and then clearing memory to check my tape.

There is an error in Line 50 of MY OWN MONEY #3. It should be JJ=AW-1T. Otherwise you are told your taxes instead of your refund.

Dennis Church
Collinsville, IL

GETTING TOGETHER

Editor:

I would just like to let you know how much I enjoy your magazine. I have had my 80C for about 20 months now and have been starving for more information. Your magazine satisfies most of that need.

I converted my 80C to 32K myself and had the same problem as James Richter. I had a bunch of 4K programs that were too much trouble to load but I didn't want to throw them away. So, I came up with this method for merging programs together.

To start, turn the 80C on and enter PRINT PEEK(25),PEEK (26)

If you do this before you run any programs or clear any memory, decimal address 25 should contain a decimal 30 and decimal address 26 should contain a 1. Now CLOAD your first program and renumber it if necessary. Then, enter the following command: POKE 25,PEEK(27);POKE(26),PEEK(28)-2

This sets up pointers to the end of the previous program and prevents the next program from being loaded on top of it. Now you can CLOAD another program. For each program that you want to merge, simply POKE the addresses as above and then CLOAD and renumber it so that the first line number is higher than the last line number of the previous program. A

PRINT MEN command will show you how much memory is available.

When you have CLOADed the last program, enter the following command: POKE 25,30:POKE 26,1

This sets the pointers back to the start of the first program. Your programs are now merged. By renumbering them and adding a menu, you will have merged several programs and made them work as one.

One word of caution: If you merge programs and use DATA statements or the same variables your programs may go bananas if you don't change them. Also, do not try to run programs while doing this.

This method is more simple than the one mentioned in your Letters column previously and will save wear and tear on the cassette cable, too.

Dennis Weide

Albuquerque, NM

(EDITOR'S NOTE: This routine was published in one of the earliest editions of the *RAINBOW*. We're running this letter because Mr. Weide obviously discovered it independently and, since we have so many new readers, we thought it would be helpful to do this again.)

HARDWARE MAN

Editor:

I have to take umbrage with Jim Rauh's remark in April. I am a Hardware Man and have been since my cruise in WW II as a Navy Electronics Technician. From my talking with others I know there are a lot of us hardware types in the 80C ranks.

We hardware men do have a real area of interest in common with Mr. Rauh and his "novice and semi-technical types." We, like you, would love for someone to help us learn to operate and use this lovely piece of machinery.

For instance, I have one of the very first 80C's. I also have one of the first LP VIII's. But, there is not one place in either of the 80C manuals or the LP VIII manual that shows a written program of how to have these two units function together.

I can't close without saying a good word for Dave and his gang at Chromasette. The programs and games on his tapes have helped me learn more about 80C than all the non-info in both manuals that came with the computer.

Russell Hokanson
Covina, CA

the ASSEMBLY CORNER

By Dennis S. Lewandowski
Rainbow Columnist

This month I would like to start the column with a small observation I have made. It seems almost every magazine concerned with the 80C has begun a series of articles concerning Assembly Language. It would seem that the question would come up of which is the best series to follow.

Well, putting in my two cents worth, I would say ALL of them. No two people share the same exact experiences or writing style. Therefore, if you are serious about gaining information about this subject, read and try all sources available. I know I do.

Before we start, let's all open to page 271 of *Getting started with COLOR Basic*. Here we have what is called a "Memory Map" of the inner workings of 80C. The addresses of the items listed on this page are in both hex and decimal. I will always refer to an address on this map in HEX. I will also use a dollar sign to denote the address as Hex. The "\$" symbol is used by most editor/assembler packages to represent Hex.

Now to the task at hand, Indexed Addressing. This has to be one of

the most powerful, and useful, methods of accessing and using data in the 80C. Let's look over Program Listing #1 step by step and see what's happening.

The first thing we will do is set up our index registers by loading them with the correct areas of memory we are going to use. We'll load the "X" register with \$0400. What's at \$0400? The video display of the 80C. The display occupies \$0400 to \$05FF (or 1024 to 1536 if you insist on decimal). Next, we load the "Y" register with \$A000. At this location we have the start of ROM memory in a non-extended 80C. Now we have two pointers set at different areas of memory -- one pointing at RAM, the other pointing at ROM. Sounds interesting already.

How about that word in the listing "LOOP"? This is what we call a label. Since the assembler does not recognize line numbers, as BASIC does, we have to use labels to identify a particular memory location to the assembler. In the same line, we have LDA Y+ LDA is assembler shorthand for Load A. The comma tells the assembler we wish to use the indexed mode of addressing. The "Y" is, of course, the register we want to use as a pointer. And the plus sign means the Y register will automatically be INCRemented (added to by 1) once the instruction is executed. The same is true of the next line, except this time we are STORE(ing) A in the memory location

PRESENTING JARB...



• MYSTERY MAZE •

Excellent test of nerves and skill; escape this 3-D maze without touching the electrified walls; lose points if you stop to look at your map; random start locations prevent memorization; play time varies from minutes to hours.
16K EXT.....\$14.95

• VAMPIRE •

Locked in a 60 room mansion; your only escape is to find and destroy dreaded Nosferatu before sundown; time play averages 6-plus hours.
32K EXT.....\$14.95

• JUNGLE TREK •

Lost in a jungle with wild animals lurking; your only survival is to find a safe compound before you are lunch for lions; high resolution; multi-color.
16K EXT.....\$14.95

• BANDITS/NUMBERS •

1) Slot machine simulation; low resolution graphics with sound effects.
16K EXT.....\$14.95

2) Try to guess the computer-chosen number from 1 to 1000 in 10 or less tries; develops mathematical skill.
4K EXT.....Both for \$14.95

• LAZER STAR/HELO BATTLE •

1) 2 players avoid destruction by blasts of mysterious lazerstar while battling each other for possession of Lazerstar
16K EXT.....\$14.95

2) 1 player/2 joystick combat game to blow up 5 blockhouses while watching fuel, ammo, and avoiding anti-aircraft fire
16K EXT.....Both for \$14.95

• JARB CODE •

Encode/decode important messages or other information in a virtually unbreakable format.
16K Extended Basic Color Computer...\$15.95
*Atari 800 Disk Version.....\$20.95

• BIORHYTHM/PSYCHIC APT. •

1) Prints biorhythm charts of nearly unlimited length; attractively formatted for use on Line Printer VII
16K.....\$15.95

2) Your psychic ability is determined through questions evaluating your psychic experiences
16K.....Both for \$15.95

• JARB PRINTER UTILITY •

Mini word processor containing mailing and cassette label generator; printer test; internally stores up to 1000 x 80 lines of text
32K.....\$20.95

JARB SOFTWARE

1169 Florida Street
Imperial Beach, CA 92032
(714) 429-5516

Dealer/Author Inquiries Invited

*Atari 800 is a trademark of Atari Inc.

**Installation of these items will void the Radio Shack warranty. Radio Shack is a trademark of the Tandy Corp.

•• 16K/32K

MEMORY UPGRADE KIT •

Hardware and instructions to convert 16K color computer to 32K; minimal soldering required; installs in 30 minutes
\$24.95

•• 4K/16K

MEMORY CHIP SET •

Eight NEC 4116 200 Nanosecond chips with installation instructions; no soldering; installs in 25 minutes
\$16.95

•• VIDEO INTERFACE KIT •

Brings out composite video signal for interface to monitor; instructions included for external sound.
\$19.95

• C-05 AND C-10

DATA CASSETTES

\$.85.....QTY 1-10.....\$.95
\$.75.....QTY 11-20.....\$.80

Call or write for price on larger quantities

• DUAL JOYSTICK UNIT (D.J.) •

Single unit assembly enhances playability of multi-joystick/player games; convenient press-to-fire buttons.....\$29.95
+\$4.00 Total shipping and handling

All programs warranted 60 days from date of purchase to original purchaser.

Unless otherwise specified, shipping and handling \$2.00 per order.

California Residents add 6% sales tax
COD orders accepted

that the X register is pointing to.

OK. So far, so good. We have taken the contents of memory location \$A000 and Loaded it into the "A" register. Then we Store the contents of the "A" register in memory location \$0400. A few other things have happened as well. After "A" was Loaded with the contents of \$A000, the "Y" register was INCremented by 1. So the "Y" register now contains \$A001. The same follows once the contents of "A" was STored in \$0400, and the "X" register is now at \$0401.

This will help explain the next instruction, CMPX #\$0600. We know, from the memory map, that the screen ends at \$05FF. We should also be aware that if we continue to fill memory with the contents of ROM, we will soon overwrite our program. Therefore since we cannot see (on the screen) what's happening, this is where we will stop this data movement.

By using the CoMPare instruction, we have told the CPU: "HOLD IT JUST ONE NANOSECOND!" We want to see if you've done your job yet. So, being very obedient, the CPU checks the "X" register and sees if it matched the IMMEDIATE data of \$0600. Since this is only the first pass through the program, and "X" contains \$0401, it just continues along its merry way. If it had found \$0600 it would set the zero flag which would say "YES, the 'X' register is EQUAL to \$0600." The following line is a test BEQ DONE. This is a simple example of the LOGIC, or decision-making ability of your 80C.

Branch if Equal or BEQ tells the CPU what you want done with the results of the CoMPare. When the "X" register does equal \$0600, the CPU will add the Program Counter to a predefined number (defined by the assembler when it calculated the Branch), and release 80C from the LOOP we have set up. Kind of remind you of a FOR-NEXT loop in Basic?

The next instruction really makes our LOOP. BRanch Always or BRA LOOP, Branch when? ALWAYS! NO questions asked, no compares, nothing! Just keep going to LOOP. We do want to fill the display screen? So we set up an infinite loop. If not for the compare we did earlier, this program would go on forever.

Well, that's the main body of the program. How 'bout this other stuff? The next line, DONE, is a label, JSR \$A1C1 is a Jump to SubRoutine at ROM location \$A1C1. In a JSR -- Jump to SubRoutine -- the CPU knows its just leaving the main program for a while, and expects to return. (Similar to

Basic's GOSUB command). So the CPU will "STACK" all the registers, perform the subroutine, and return to the program. The real beauty of using subroutines is that you don't have to write all the extra code, which should make your program more compact.

This is a very handy subroutine indeed. It is the keyboard scan routine, without the cursor, kind of an INKEY\$ command for machine language. This next line may be confusing to you. When you jump to a subroutine, you actually are going to another machine language program. The subroutine for the keyboard scan will return a zero in the "A" register if you do not press a key. By using the next line, BEQ DONE, we allow the subroutine to do the CoMPare for us. These two lines will hold the screen frozen so we may look at it until we press a key. Once a key is pressed, the "A" register is loaded with the Hex value of that key and will NOT be zero. Since we have left no other instructions for the CPU, it has no choice but to execute the last line. This is a method of programming sometimes called Fall-Through Programming.

The final instruction returns our 80C to its familiar face, BASIC. JMP \$A027 is a mandatory JuMP to Basic. You'll notice we didn't branch. We could have, if we used the LBRA instruction. But we wanted to show some true end to this program, and I'll try to use as many instructions as possible to get you familiar with them.

Now I can see your getting ready to pull 80C out and try this program so I won't hold you up much longer. We'll continue this topic next month. But before you go, may I suggest you try playing with this short program? That's right PLAY with it. Try things like, leaving the "+" off the LDA ,Y+ instruction, or load "Y" with different value in ROM, or even RAM. How about LDA ,Y++? HMMMMM, could you set this up to search memory for give byte?

We'll see you next month.

LDX	#\$0000	Load X with video
LDY	#\$A000	Load Y with ROM
LOOP	LDA ,Y+	Load A with Y pointer
	STA ,X+	Store A at X pointer
	CMPA #\$0600	Have we filled the screen?
	BEQ DONE	YES, then DONE
	BRA LOOP	NO then LOOP
DONE	JSR \$A1C1	Check keyboard
	BEQ DONE	No press check again
	JMP \$A027	GOTO BASIC

Software Review...

THE SOLUTION USES GRAPHIC LETTERS

You can write and PRINT graphic-generated letters on the two-color graphic screens with *THE SOLUTION* (Snake Mountain Software, P.O. Box 5722, Raleigh, NC, 27650, \$12.95).

The name of this machine language program is taken from a desire on the part of some to have a four-line window at the bottom of the screen for words, something like an Apple computer. One of the options is for a four-line scroll at the bottom, leaving the remainder of the screen for true graphics. But, it also takes advantage of the power of the 80C and can print letters and words anywhere on the graphic page.

The display is 42 characters by 21 lines and you can have graphic text and characters on the screen at the same time. There is both an upper and lower case with descenders and the program interfaces directly with BASIC.

It's a nice program which could benefit greatly from better and more detailed instructions. This program works and is a good implementation of an idea. We wish that just *how* it provides *THE SOLUTION* were a bit easier to get at.

There is also one problem of incompatibility between the program and BASIC's ROM, but the fix is easily made and is explained in detail.

Software Review...

THIS SPACE INVADERS IS A GOOD ONE

SPACE INVADERS (by Space Cadet Enterprises, 523 Big Ridge #5, Biloxi, MS, 39532, \$26 cassette, \$29 disk, \$5 discount for cashier's check or money order) is so much like the arcade game that I'm hard pressed to tell them apart. It's in the 256x192 graphics mode with four colors (black, red, blue and white) and has very good sound.

There are 500 speed levels to this game. This gives a lot of variety and easy adjustment to individual tastes and abilities. The first speed setting is very slow, more suited for young children than adults (200 or below are best suited for younger kids). Most arcade games run too fast for children and the ability to slow the game down is a real plus with kids in the house.

The play on the 500 level is blinding and just the thing for someone with overabundant skill

and/or confidence.

On any speed level, there are three speed settings for the bombs. You can raise or lower their speed without changing the overall speed of the game. Too, there are normally three bombs on the screen at a time, but this can be changed to anywhere from 1 to 20. The more bombs there are, the slower they fall and the speed adjustment helps a lot with this.

SPACE INVADERS by Space Cadet needs 16K of memory and will run with either extended or non-extended basic. It is in machine language. Joysticks are not required. My game had an error in it, but Space Cadet fixed it and had a new, error-free version out to me in a week.

There are a lot of invader games on the market, and I can't say if this one is any better than them -- but they'd be hard pressed to keep up with this exciting game.

-- Charles Blakeney

(EDITOR'S NOTE: We took a look at this game independently, and it is one of the best! Very versatile and a great deal of fun to play. We recommend it highly.)



Software Review...

**DATE-O-BASE
CALENDAR WORKS WELL**

If you are one of those people who just *has* to keep track of your time or can't remember a birthday or anniversary date for the life of you, then **DATE-O-BASE CALENDAR** is the answer to many of your problems.

This excellent program (from Custom Software Engineering, 807 Minuteman Causeway, Cocoa Beach, FL, 32931, \$16.95 tape, \$19.95 disk) is a general calendar and date pad system.

You can place up to 12 short memos in any given date between the years 1700 and 2099. They could be "Wife's 30th Birthday" on the appropriate date or "Pay Mortgage" on the first of every month. Once you have these memos input, the program will store them on tape or disk and you can recall them at will.

You also have the option of searching any series of dates for either all messages or for messages of a specific type. This search is fast (especially on the disk version) and totally accurate. By using it, you can call up all birthdays in a year simply by using a key word like "birthday" or you can code in bill-paying needs by recording them with some sort of code like "\$-". Of course, if you start each bill entry with the word "pay," you can simply use that as a keyword.

Just as simply, you can delete memos and, because you can specify which memo position on the screen an individual memo should be located, you can -- if you wish -- allocate the first six slots for morning memos and the last six for afternoon and evening memos.

As a bonus, the **DATE-O-BASE CALENDAR** also does days between dates computations. Moreover, it gives elapsed time in days, days and weeks, months and days and years, months and days. The days and days and weeks automatically account for leap years.

Finally, the program will display an entire month on the graphic screen (which you can print out with a screen print program). And, it alerts you to a particular day which has a memo in it with a marker and a tone.

This offering, which requires 32K and Extended Color Basic, is a first class program.

COLORSOFT™

"Quality Software At Affordable Prices For the TRS-80® Color Computer"

* Games * Educational * Home/Personal * Financial

We Also Offer: * Custom Programming * Royalties For Software

*** Over 50 Software Items Currently Available ***

Documentation and a Limited Guarantee with all COLORSOFT™ Software.

*** 4K Color BASIC Programs ***

INVADERS: 10 Skill levels, phaser sound and exploding bombs \$12.95
DUMP: Explore the memory of the color computer-output to screen or printer 8.95
TAG: 2 player game of chase. Fast action and fun 10.95

*** 16K Color BASIC Programs ***

CASINO: One-armed bandit, blackjack, and dice games \$12.95
DISASSEMBLER: Disassemble machine language programs (screen or printer) 13.95
AUTO MINDER: Keep track of fuel usage, tune-ups, oil changes, etc., creates and maintains cassette data files for multiple autos 10.95
ESCAPE: Intermediate advent. with GRAPHICS. Player must find and decipher various clues to escape. Graphics give player the feel of being there (mach. lang. for fast action) 15.95

*** 16K Ext. Color BASIC Programs ***

SASPUS: Beginner's adventure game. Player must find and destroy the 'deadly mutant' in a genetic nuclear research center. Each game randomized \$8.95
PIRATE TREASURE: Advanced beginner's adventure-the player must find the pirate's treasure which is hidden in a cave of over 40 rooms 11.95
ADVENTURE COMBO: Combination of SASPUS and PIRATE TREASURE 16.95
FLIPUM: Color computer version of the OTHELLO type games 12.95
MAILING LIST: Cassette or disk files for names and address with comments. Cross referencing of information and name searches are featured 20.95
PEEK 'N' SPELL: Flashes word or letter on screen for children's spelling drill-New word files can be created and stored on cassette tape 10.95
MATH DERBY: Math drill in a horse race game for 1 to 3 players-variable difficulty 11.95
LOAN: Amortization schedules with breakdown of monthly payments (avail. in 4K) 10.95
STOCK ANALYZER: Keeps track of stock prices and maintains portfolio data base includes additional program for projecting price trends 16.95
COLOR CUBE: CoCo version of the popular cube puzzles. Features include solution by computer and saving partially solved puzzle on tape 17.95
DISK BACKUP: Saves Diskette based programs onto cassette and checks for disk errors 14.95

Send \$1 for catalog containing full descriptions of all available software and receive \$2 discount coupon. Free catalog with an order from this ad.

GOLDLABEL™ BLANK CASSETTES

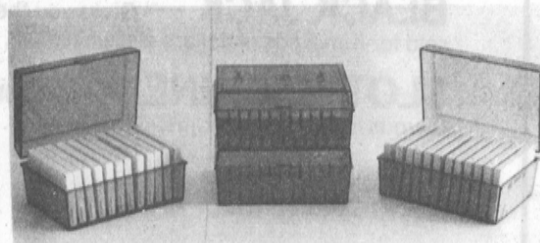
* PREMIUM 5 SCREW SHELL * DIGITAL DATA QUALITY * LOW NOISE * MADE IN USA
* GUARANTEED

1 DOZEN C-10 LENGTH \$8.00 + \$2.00 shpg. 1 DOZEN C-30 LENGTH \$11.00 + \$2.00 shpg.
2 DOZEN C-10 LENGTH \$15.00 + \$3.50 shpg. 2 DOZEN C-30 LENGTH \$20.00 + \$3.50 shpg.

Individual storage boxes (sold only with cassettes) \$2.40 per dozen.
CASSETTE CADDY \$5.49 + \$1.50 shpg./2 for \$10.00 + \$2.50 shpg./\$3.95 with cassette purchase (no shpg. chg. on caddy)
Foreign orders include shipping at 16 oz. per dozen tapes/9 oz. per caddy/13 oz. per doz. boxes
Shipments in U.S. are by UPS (no delivery to PO boxes) Add \$1.50 per doz. tapes for First Class Mail.

!!! NEW !!! CASSETTE CADDY !!! NEW !!!

TIRED OF MISPLACED TAPES AND A CLUTTERED WORK AREA? TRY OUR HINGED TOP SMOCKED PLASTIC CADDY THAT HOLDS 12 TAPES IN ONE HANDY LOCATION



Visa and Mastercard accepted (include expiration date) Orders paid by cashiers' check, money order or bankcard are shipped within 48 hours. Personal check takes 1-2 wks. No COD. Some foreign sales are restricted. Texas residents add 5% tax on blank cassettes and storage units.

SEND ORDER TO: **COLOR SOFTWARE SERVICES**
PO BOX 1723
GREENVILLE, TEXAS 75401

* DEALER INQUIRIES INVITED * QUANTITY DISCOUNTS AVAILABLE

Note:
These are the
programs that
have received such
National Acclaim!!

ExIBMer (NOW RETIRED)

For the FIRST TIME — Makes available to the PUBLIC
His personal collection of superior programs for the

TRS-80 COLOR

SEE HOW THE PROFESSIONALS DO IT!!
ALL PROGRAMS ARE OVER 14K LONG!!

TALKING GRAPHIC DEMONSTRATION

Like no other Computer Program that ever existed! Your CoCo will talk to you with a beautiful musical background and tell all about himself while displaying dozens of action packed hi-resolution graphic demonstrations. Programs RUN non-stop for 12 FANTASTIC minutes from 1 CLOAD.

"This demonstration is MANDATORY. You and your CoCo deserve this program."
Quote The Rainbow.

\$24.95T★ 

THE DISK DOCTOR — Cure that sick feeling and utter frustration caused by CRASHED I/O ERROR and UNREADABLE disks. Will SALVAGE M/L, BASIC, DATA, ASCII, even MPP Pictures. Menu driven for easy use. 100% visible operation lets you see what you are doing.
Automatic SALVAGE to NEW disk. All in OPEN BASIC!

\$49.95D★ 

MPP-TUTORIAL — Programming tool of the professionals — "lets you EASILY create superior graphics without using the tedious DRAW, PAINT, LINE, PSET, CIRCLE, etc. commands. I have seen the results, and they are INCREDIBLE — If you want to see and use the full graphic potential of your CoCo, this program is — REQUIRED!" Quote Chromasette.

\$34.95T or D★ 

EL CASINO — Three STARTLING action packed hi-res graphic games that have received RAVE reviews. All programmed with MPP. Each game is over 14K long.
All three games below.....

\$49.95T or D★ 

DICE GAME — The ONLY crap game that allows 4 players to make
12 Field Bets before every roll.....

\$24.95T or D★ 

BLACK JACK — Gives you the FAMOUS CARD COUNTER
sold for hundreds of dollars elsewhere.....

\$24.95T or D★ 

SLOT MACHINE — Looks like a \$30,000 Casino machine.
Sounds like one, too. Adjustable pay-off.....

\$24.95T or D★ 

★ T = 16K-EXTENDED

★ D = 32K-DOS

★ POSTAGE PAID

★ 704-452-4673

SUPERIOR GRAPHIC SOFTWARE

406 LITTLE MOUNTAIN ROAD — WAYNESVILLE, N. C. — 28786

Software Review...

THESE THREE WILL LET 80C "TALK"

Ever since we listened to HAL in 2001 - A Space Odyssey, we've been fascinated by talking computers. And your 80C can talk with the best of them, as evidenced by three unique programs available from Star-Kits and Spectral Associates (details below).

COMPUVOICE is a synthesizer that allows you to type in letter combinations called phonemes, which tell the 80C how to pronounce words. SOUNDSOURCE makes it possible for you to load sounds directly into memory and have them play back. You can also modify the sounds. NENTALK will "read" the contents of memory locations to you so that you can check the accuracy of machine language program listings. Star-Kits makes NENTALK, the two others are available from Spectral. All are in machine language.

The COMPUVOICE program allows you to program words into 80C using letter and symbol combinations. A list of them is supplied. For example, if you want to have the computer speak the word "eight" to you, you set up a string with the letter combination "AAYT." In all, there are 35 phonemes, ranging from a simple "B" to some complicated sounds such as the "NG" sound in "think." There are also stops and modifiers, in addition to the phonemes.

The sounds are set up as strings and can be executed as part of a BASIC program. This -- like all the other programs reviewed here -- is not tape recorded sound played through the speaker, it is actual computer-generated sound.

COMPUVOICE does take some getting-used-to. It requires you to think about words in terms of how they sound rather than how they are spelled. Once your mind makes this conversion (and there are some pages of documentation to help), the sound is a pretty fair approximation of human speech. The mating of the machine language program and a BASIC program which will use the sounds is easily accomplished and clearly explained.

SOUNDSOURCE will allow you to load any sound in from your tape recorder using a special (supplied) cable which runs from the recorder to the right joystick port. The program takes this sound, converts it to digital code, and then allows it to be played back. In addition, you can modify the sound with your joystick and you can also see a graphic representation of the sound on the

screen.

Like the other programs, this is not taped sound, but computer generated sound. I ran a test in with my voice and was amazed to hear it come back out from the 80C's memory. And, using one of the program's functions, I even played my voice back backwards -- since it is reduced to digital information, it is easy to do.

SOUNDSOURCE allows you to modify sounds and to save them as well. You can also shift them in memory, repeat them, and play them backwards. With all this capability, it is an excellent way to experiment with computer sound. You can create almost any noise you like.

It is especially interesting to see the sound waves on the screen. This will give you some ideas of what the sounds look like and how they might be changed to achieve the specific sound you want.

NENTALK solves a problem that plagues us all. It will "tell" you what is in a specific memory location. No more asking someone to help proofread your machine language listings, this one does it for you.

The "proofing" is done in hexadecimal. If you tell NENTALK to start at memory location 600 (hex) it will "say" "4C" or something to that effect. The voice is extremely clear and understandable.

Hitting a comma makes NENTALK say the memory address and the contents. Hitting a period gives you just the contents. Hit another comma (or period) and it moves to the next address.

If you are one of those people who needs someone to help you proofread machine language listings for accuracy, this is a perfect program for you. And, as with Star-Kits' HUMBUG program, the documentation is excellent.

COMPUVOICE, Spectral Associates, P.O. Box 99715, Tacoma, WA, 98499, \$44.95.

SOUNDSOURCE, Spectral Associates, \$24.95.

NENTALK, Star-Kits, P.O. Box 209, Mt. Kisco, NY, 10549, \$20.

LEM...Lunar Lander with new landscape each game!!

& PIRATE ADVENTURE....both for only

-\$8.00- (plus 50¢ postage & handling)

16K Ext. Cass.

Free Space Game

SUPERZAP!!

Century Software
1649 Geneva Ave. No.
St. Paul, MN 55119

First of a Series...

80C PICKS THE NATIONAL FOOTBALL LEAGUE16K
ECB

by John Waclo



It's time for NFL FOOTBALL! Is it really? Well if you're a football nut and you enjoy using your Color Computer, it's time to get ready for the 1982 NFL season.

Starting with this issue, I begin a three-part series on the NFL. Last year we spent the entire NFL season using our 80C to watch the teams. During the next three months we'll tell you what we learned and provide the program listings so you can try it yourself.

At one point last year we had three, 32K, 80C's analyzing data every single week. Even if you're not interested in the programming, you'll find the results fascinating. Why? Because we tried to predict the outcome of future games. The software even took into account the "point spread".

In Part I of this series we'll talk about what we learned from last season and we'll get your 80C into the NFL with a program listing that will generate a week-by-week schedule for the 1982 NFL games. In addition to being informative, the output from that program will be used to collect data for *The NFL Report* program.

Part II will present our program that generates *The NFL Report*, how to read it, how to enter data, and how it works. This report contains 32 pages of summarized team data, and is updated each week of the season. We've included the San Francisco 49er's team summary, from this report, for your review in this article.

Finally, Part III will discuss what we found as a result of closely watching each team's performance. From last year, we learned the NFL season plays like a chess game. It has an Opening, Mid-game, and End-game. Each has to be treated differently. See if you agree with our predictions and trends in Part III.

So much for an overview, let's get on with Part I.

The NFL season is 224 games, played by 28 teams in a time period of 16 weeks. It's all run by the National Football League, 410 Park Avenue, New York, (212) 758-1500; nice

folks. This year's season starts on September 12 and we spin the team-wheel every weekend thereafter.

GIVE ME SOME OVERALL FACTS ABOUT LAST YEAR?

During last year's season we generated over 700 pages of printout while watching the progress of each team. Let's start with a little "cocktail knowledge" and some averages.

The next time you're at a party you can ask the question, "How many total points were scored in the entire '81 NFL season?". The correct answer is 9,282. When you have a computer plowing through home teams, away teams, point spreads, favorites, underdogs, and team power factors, you might as well have it calculate totals like this.

On the surface the total points scored in a given season appears totally useless, and it is. However, since we also know there are 224 games, and two teams in every game (in some games I have my doubts), the total points scored in an average, 1981, NFL game was 42; (21/team). Just think about that for a minute. That's a total of 6 touchdowns per game. It really looks like the recent rule changes have opened up the scoring.

WHAT WAS THE SCORE FOR AN "AVERAGE" NFL GAME?

The average score in 1981 was 27-14. Here's the important fact you need in order to calculate that number. The average point difference per game last year was 11.8. That really yields a game score of 27-15, but since 15 is hard to come by we made it 27-14.

DOES THE HOME TEAM REALLY WIN MORE OFTEN?

Yes it does. After keeping data on all the games played in 1981, we can say with accuracy that the home team won 62% of all games played. From this statistic it would appear the home team has a small, but definite, advantage.

DOES THE HOME TEAM HAVE AN ADVANTAGE WHEN YOU CONSIDER THE POINT SPREAD?

Yes, but it's very small. Again, for all games played last year, the home team won 54% of the time when you include the point spread. It looks like the people who establish the point spread are also aware of the home team winning percentage. Using the spread, they've done a good job of neutralizing the home team advantage.

For those readers who are not familiar with a point spread, or "line" as it's sometimes called, it's a small number of points assigned to one team, before the game, in an attempt to make the final score more even. When you include the point spread, you are talking a closer game.

You don't have to go to Las Vegas to find the point spread either. The NFL point spread is available in most major city newspapers under the syndicated column "The Latest Line". For the purpose of our data collection we used the "line" as published on Tuesday morning. The day after Monday Night Football.

WHEN YOU INCLUDE THE POINT SPREAD, HOW OFTEN DOES IT REVERSE THE OUTCOME OF THE GAME?

Not very often, or should I say just enough times to make things really interesting. Take your pick.

Actually, through the first 14 weeks of last season, the line only changed the winner in 21 games. That's an average of less than two games each weekend, or 10.7% of all games played.

Notice that I omitted the last two weeks of the season when I calculated the answer to this question. There's a valid reason for this. As the teams approached the playoffs, some games become meaningless because neither team had a chance for post season play. In most of these cases a line was not established. Since this would influence the statistic we're after, the last two weeks were dropped from our calculations.

HOW MANY TIMES DID THE POINT SPREAD MAKE THE GAME END IN A TIE?

For all 224 games played, only two ended in a tie when you include the spread. So the next time you're looking at a 3 point spread, and you're wondering if the other team will kick a field goal to end the game in a tie, you have the odds in your favor. It only happened in 0.9% of all games played last year. Of course that doesn't provide much consolation for the folks in the 0.9% category.

FOR MONDAY NIGHT FOOTBALL, DOES THE HOME TEAM HAVE A SIGNIFICANT ADVANTAGE?

(Continued on next page)

NOTHING FANCY — JUST GOOD SOFTWARE

DATE-O-BASE CALENDAR

Puts you in charge of your schedule. Graphically displays any monthly calendar between 1700 and 2099. You put in up to twelve 28 character memos per day - calendar shows where the memos are - call up of day shows details. Use for appointments and a log of past activity. Study the chronology of the American Revolution or note the day your mortgage will be paid off. Search capability allows you to list or print all memos between specified dates or only those meeting key word criteria. Date computation shows elapsed time between two dates in days, weeks, months, and years. IN BASIC - REQUIRES 32K.

TAPE DATE-O-BASE CALENDAR - \$16.95

(max. 400 memos/tape file)

DISK DATE-O-BASE CALENDAR - \$19.95

(over 4,000 memos/disk - max 300 memos/month)



GRAPHIC SCREEN PRINT PROGRAM

For use with TRS-80® Line Printer VII and VIII. Ours is better because it works in all PMODES and lets you shift the screen image anywhere on the printed page. Load the relocatable code where you want it, lets you use all of your 32K machine. Now available for both Color Basic 1.0 and 1.1. Use EXEC41175 to see which you have and specify with order.

\$7.95 in Machine Language



HELP YOUR CHILDREN LEARN OVER THE SUMMER!

MATH TUTOR

Five programs that go from math fact (+, -, X, /) drill to full addition, subtraction, multiplication, and division at four levels of difficulty. Provides a step by step approach with error correction and rewards for good performance.

\$13.95 in BASIC



SPELLING TEACHER

Up to 200 of their spelling words stored on tape or disk are presented in four lively study modes including a scrambled word game.

\$12.95 in BASIC



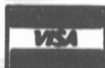
WE WANT YOUR SUGGESTIONS! Let us know what software you need. We don't promise to develop it, but if we do, you will be offered it at one half our retail price. No obligation on your part!

ALL PROGRAMS require Extended Color Basic and are delivered on cassette. All, except Tape Date-O-Base Calendar, are DISK System compatible.

TRS-80® is a trademark of Tandy Corp.)

Custom Software Engineering, Inc.

807 Minutemen Causeway
Cocoa Beach, Florida 32931
(305) 783-1083



For VISA and Master Card orders:
Include type, account number, expiration date, signature and phone number.
Sorry! No COD's.

Add \$1.00 per order for shipping.
Florida residents add 5% sales tax.
Return within two weeks if not completely satisfied.

NFL (From Page 13)

Last year's numbers heavily favor the home team. I'm not sure if that's always the case, but the final results are interesting.

When you only consider Monday Night Football, the home team won 75% of all games. Said another way, the home team won 3 out of every 4 games played. Even when you include the point spread, the home team still won 62% of all the Monday night games.

Twice last season, the addition of the point spread reversed the winner of Monday Night Football. On both occasions the home team won the game, but the away team won when you included the spread.

Monday Night Football has become a real media event. Just look at its acceptance by the public and watch the enthusiasm of the home town fans. Apparently this does have a significant impact because the home team is winning more often. In any case, it's a number worth watching in the '82 season.

WHO WINS MORE OFTEN, FAVORITES OR UNDERDOGS?

The correct answer is both and neither. I'll explain myself after we

define these new terms.

We mentioned before, the point spread is some number of points given to one team, before the game begins, in an attempt to make the final outcome more even. The team which receives the points is called the *underdog*. The other team is called the *favorite*.

Don't draw the conclusion that the underdog is the poorer team just because it received points. It's intuitive to feel that way, but it's wrong. Many factors are involved in establishing which team will receive points, and which will not. Items like player injuries, home field weather conditions, and the won/lost record between the teams in previous meetings, all play a significant part in establishing the line for a given game.

Getting back to the main question, the answer comes in two parts. Through week 14 of the season (196 games), the underdog won 51% of all games, favorites won 43%, and the remainder were ties or "even" games with no line. Again, the last two weeks of the season were omitted because some team pairings were not given a line. These teams had no hope

Sugar
Software

introduces...

Silly Syntax

a sensational and educational version of a popular party game for the TRS-80 Color Computer...

For 1 to 10 players. Load a story into the computer. The players are asked to supply a noun, verb, part of body, celebrity, etc. which the program uses to complete the story. The story, which is displayed when all words are entered, will be hilarious. Silly Syntax requires Extended Basic. For \$19.95, you get a user guide and a tape containing the Silly Syntax game and 2 stories.

You can create your own stories or order story tapes from the selection below.

Silly Syntax stories - Ten stories per tape.

SS-001 -> Fairy Tales	SS-004 -> Current Events
SS-002 -> Sing Along	SS-006 -> Adventure/Sci-Fi
SS-003 -> X-rated	SS-007 -> Potpourri

Each story tape is \$9.95, 10% off for 3 or more story tapes.

Ohio residents add 5.5% sales tax.
Add \$1.00 per cassette for postage and handling.
Dealer inquiries invited.



Sugar Software
2153 Leah Lane
Reynoldsburg, Oh 43068
(614) 861-0565



®TRS-80 is a trademark of Tandy Corp.

Sugar
Software

introduces...

Auto Run

Auto Run is a utility program for the TRS-80 Extended Basic Color Computer. It is used to add convenience and professionalise to your software. Auto Run will create a tape which will consist of a machine language loader followed by your basic or machine language program. With this tape, a simple CLOADM command will load and start the loader which will then load and start your program.

You may design a title screen with the graphics editor which will display as your program loads. Also, you may record a vocal or musical introduction preceding your program. The Auto Run loader will control the audio on/off.

Basic programs can be set to load anywhere in memory above \$600 (the PCLEAR 0 page).

Software authors: The Auto Run prefix may be appended to your software products.

Auto Run is \$14.95 and includes complete documentation and an assembly source listing.

Ohioans add 5.5% sales tax.
Add \$1.00 per tape for postage and handling.
C.O.D. orders are welcome.
Dealer inquiries invited.

Sugar Software
2153 Leah Lane
Reynoldsburg, Oh 43068
(614) 861-0565

®TRS-80 is a trademark of Tandy Corp.



for a playoff possibility.

These statistics would seem to indicate that neither favorites nor underdogs have a real advantage. True, last year more underdogs won, but it's so close that it could change from year-to-year.

On the other hand, when you look at the season week-by-week, a different story begins to emerge. This story says both favorites and underdogs win during different parts of the season. I think this theory has credibility.

Basically, we know from looking at Monday Night Football performance, the home team appears to have a real advantage. It looks like the home team, and fans, play the same part during the beginning of the season.

After the first three weeks of last season, favorites had won 54% of the games; underdogs 38%. Clearly favorites seem to dominate the early part of the season. The next nine weeks (week 4 thru 12) saw the favorites only win 39% of all games played. The underdogs won more games for the rest of the season. It looks like the old saying, "Take the points and go with the underdog", might have some merit. Especially after week three.

DO HOME-TEAM-FAVORITIES WIN WITH A HIGH PERCENTAGE?

If you consider all of last season, they were a little less than even; 46% for the year. However home team favorites were dynamite at the beginning of the season. For the first three weeks of last year they won an excellent 60% of all games played. Even the few away-favorites did well during the early weeks, winning 75% of the time. However, away favorites finished with only an overall 42% win percentage.

HOW DO YOU CALCULATE THE RELATIVE POWER OF A TEAM?

If you're going to try to predict future game winners, you must have a way to give each team a power factor. One thing we learned from last season is don't get carried away with complicated analytical expressions. We tried different approaches, in parallel, using more than one 80C and the simple techniques seemed to work best. The equation we're using now takes into account each team's wins, total points scored, and the total points allowed.

USING YOUR APPROACH, WHICH TEAMS HAVE THE MOST POWER IN THE NFL?

There's no big surprise here. Our model confirmed reality. The big power teams today are:

-San Francisco	+20
-Cincinnati	+19
-Philadelphia	+19
-Dallas	+18

WHICH TEAMS HAVE THE LEAST POWER?

Just as our model confirmed the most powerful teams, it also did a good job at the other end of the scale.

-Cleveland	-1
-New England	-1
-New Orleans	-7
-Baltimore	-15

WHEN YOU INCLUDE THE SPREAD, WHICH TEAMS WERE THE BIG WINNERS AND LOOSERS LAST YEAR?

Here are the top three and bottom three teams when you consider the spread:

-Cincinnati	12-4
-Miami	12-4
-San Francisco	12-4
-New Orleans	6-10
-Baltimore	4-12
-New England	3-13

By now you can see there are many ways to look at last year's NFL data for analysis. We could go on for quite awhile but that's not the entire purpose of this article.

If you think collecting information like this would be fun, and it would make every game in the NFL more interesting, then it's time to get your 80C into the NFL with our first program.

On April 8th the NFL released the 1982 National Football League schedule. I was under the impression these games were scheduled years in advance. They're not. In fact we had to work hard to get the schedule in this issue. Here it is! Only three weeks old, and already in RAINBOW.

If you load the listed program it will produce the schedule of games for any week you choose. The program is configured for an Epson MX-80 printer. However, it can be easily modified for most popular printers. Change line 110 for your Baud rate. You must also have at least 16K and Extended Basic to use this listing.

Run the program and it will ask

(Continued on next page)

NFL (From Page 15)

"which week's" schedule you desire. Enter your week of interest and the program will tell you to <ENTER> when the printer is ready. After that it will print the desired schedule.

IMPORTANT NOTE! At the pause... "hit <ENTER> when the printer is ready", if you enter the code "77 <ENTER>" the program will produce weekly schedules starting from the week you entered, to the end of the season. Therefore, if you want to see the entire '82 weekly schedule... enter "1" for the week of interest and the code "77" to finish the year.

The schedules which are generated clearly show the home and away teams for that week. On either side of the teams you'll see a capital "G" and "S". This stands for Game and Spread. If you want to try and guess winners for that week, just circle the appropriate "G" and "S" for the teams you think will win the Game and Spread.

The numbers at the top of the schedule indicate the number of games played to that week. There is a space to the left of each number for you to keep track of how many you've guessed correct. There are also numbers at the bottom of the schedule for you to total you're results for that week.

We'll talk more about the main program, *The NFL Report*, in the next issue (you'll need 32K to run it). It's the program that produced the team summary you see in this issue. Data that you collect on these schedule sheets will be used by the *Report* program so get this one running by next issue.

(NOTES: The baud rate is set in line 110. If you have a standard printer with a set baud rate, you should change this line to REN. Lines 420, 440 and 490 use CHR\$(14) to go to the double-wide characters. If you do not have an MX-80, your code may be different to go to doublewide. You may also have to turn off the doublewide characters in those lines, using your own printer controls. The MX-80 turns the doublewide characters off automatically with a linefeed.)

```
10 *****NFL SCHEDULES*****
20 'REV 4/19/82; (C) 1982,
30 'JOHN WACLO
40 'BOX 11224
50 'PITTSBURGH, PA 15238
60 CLS3:PRINT " ***NFL FOOTBALL
SCHEDULES***"
70 PRINTSTRING$(32,"=");:PRINT
80 INPUT"SCHEDULE FOR WHICH WEEK
";W:IF W<1 OR W>16THEN80
90 R2$=CHR$(10):R1$="":DINT$(28)
,G(448)
100 PRINT:PRINT"WHEN PRINTER IS
READY...":INPUT"PRESS <ENTER>";H
```

```
110 POKE150,18:POKE155,80
120 T$(1)="PITTSBURGH STEELERS"
130 T$(2)="CLEVELAND BROWNS"
140 T$(3)="HOUSTON OILERS"
150 T$(4)="CINCINNATI BENGALS"
160 T$(5)="BUFFALO BILLS"
170 T$(6)="MIAMI DOLPHINS"
180 T$(7)="NEW ENGLAND PATROITS"
190 T$(8)="NEW YORK JETS"
200 T$(9)="BALTIMORE COLTS"
210 T$(10)="SAN DIEGO CHARGERS"
220 T$(11)="OAKLAND RAIDERS"
230 T$(12)="KANSAS CITY CHIEFS"
240 T$(13)="DENVER BRONCOS"
250 T$(14)="SEATTLE SEAHAWKS"
260 T$(15)="DALLAS COWBOYS"
270 T$(16)="PHILADELPHIA EAGLES"
280 T$(17)="WASHINGTON REDSKINS"
290 T$(18)="ST. LOUIS CARDINALS"
300 T$(19)="NEW YORK GIANTS"
310 T$(20)="MINNESOTA VIKINGS"
320 T$(21)="DETROIT LIONS"
330 T$(22)="TAMPA BAY BUCCANEERS"
340 T$(23)="CHICAGO BEARS"
350 T$(24)="GREEN BAY PACKERS"
360 T$(25)="ATLANTA FALCONS"
370 T$(26)="LOS ANGELES RAMS"
380 T$(27)="SAN FRANCISCO 49ERS"
390 T$(28)="NEW ORLEANS SAINTS"
400 FOR Y=1TO448:READ G(Y):NEXT
410 FOR Y=((W-1)*28+1)TO((W-1)*2
8+28):CS=CS+G(Y):NEXT:IF CS<>406
THENPRINT"DATA ERROR IN WEEK";W:
END
420 PRINT#-2,R2$;R2$;R2$:PRINT#-
2,TAB(17)CHR$(14)"** GAMES FOR W
EEK ";W;"**";R2$;R2$
430 PRINT#-2,TAB(10)"GAME";TAB(3
6)"SPREAD";TAB(62)"MONEY";R2$
440 PRINT#-2,TAB(12)CHR$(14)"/";
14*(W-1);TAB(26)"/";14*(W-1);TAB
(39)"/";3*(W-1);R2$;R2$;R2$
450 PRINT#-2,TAB(18)"AWAY TEAMS"
;TAB(52)"HOME TEAMS";R2$
460 FOR Y=((W-1)*28+1)TO((W-1)*2
8+27)STEP 2
470 PRINT#-2,TAB(7)"G";TAB(12)"S
";TAB(17)T$(G(Y));TAB(38)" VS ";
TAB(44)T$(G(Y+1));TAB(67)"G";TAB
(72)"S";R2$
480 NEXT
490 PRINT#-2,R2$;R2$:PRINT#-2,TA
B(12)CHR$(14)"/";14*(W);TAB(26)"/
";14*(W);TAB(39)"/";3*(W);CHR$(
12)
500 IF H<>77THEN CS=0:GOTO60
510 IF W=16 THEN END ELSE W=W+1:
CS=0:GOTO410
520 DATA 25,19,23,21,2,14,3,4,12
,5,26,24,6,8,7,9,11,27,18,28,10,
13,22,20,17,16,1,15
```


530 DATA 20,5,9,6,4,1,15,18,21,2
6,28,23,8,7,11,25,16,2,10,12,27,
13,14,3,17,22,24,19
540 DATA 25,12,5,3,23,27,15,20,1
3,28,26,16,6,24,19,1,8,9,11,10,1
8,17,14,7,22,21,4,2
550 DATA 9,21,2,17,3,8,12,14,26,
18,6,4,20,23,7,5,28,11,19,15,16,
24,1,13,10,25,27,22
560 DATA 25,26,5,9,4,7,2,11,13,8
21,6,24,23,3,12,20,22,18,19,27,
28,14,10,17,15,16,1
570 DATA 25,21,9,2,23,18,4,19,15
16,13,3,12,10,26,27,7,6,28,20,1
1,14,1,17,22,24,5,8
580 DATA 2,1,15,4,21,5,24,20,6,9
28,26,8,12,11,13,18,7,10,14,27,
25,22,23,17,3,19,16
590 DATA 25,28,5,13,23,24,15,19,
3,2,26,10,6,11,7,8,16,18,1,4,27,
17,14,12,22,9,21,20
600 DATA 25,23,9,7,13,14,21,16,2
4,22,3,1,12,11,26,28,20,27,19,2,
8,5,18,15,17,4,10,6
610 DATA 5,7,23,22,4,3,2,6,15,27
13,12,24,21,20,17,28,10,19,26,8
1,11,9,14,18,16,25
620 DATA 9,8,4,16,21,23,12,28,26
25,6,5,20,24,7,2,1,3,27,18,14,1
3,22,15,17,19,10,11
630 DATA 2,15,19,21,9,5,23,20,13
10,24,8,3,7,12,26,28,27,11,4,16
17,1,14,18,25,6,22

640 DATA 27,26,25,13,5,24,4,9,15
17,3,19,12,1,20,6,7,23,18,16,10
2,14,11,22,28,8,21
650 DATA 16,19,10,27,9,20,23,14,
2,4,13,26,21,24,6,7,28,25,11,12,
1,5,22,8,17,18,15,3
660 DATA 26,11,8,6,25,27,5,22,24
9,3,16,12,13,20,21,7,14,28,15,1
9,17,1,2,18,23,4,10
670 DATA 9,10,23,26,2,3,13,11,21
22,24,25,7,1,19,18,8,20,16,15,2
7,12,14,4,17,28,5,6

Team Summary Next Page)

Software Review...

FLIGHT SIMULATOR NEEDSLOTS OF HELP

3-D RED BARON FLIGHT SIMULATOR doesn't really get off the ground as far as a quality program is concerned.

Sold by Seebree's Computing (456 Granite Ave., Monrovia, CA, 91016, \$16.95), this program does have some good graphics and, well, some potential.

But that is about all. You can get "up in the air" with it, although responses are somewhat sluggish. Once you are, you cannot "fly" anywhere, *per se*, instead, all of a sudden it is time to land.

Save your money.

HERE ARE 10 GOOD REASONS TO JOIN

- 1.) **FREE** programs. Good programs written by members are yours
- 2.) Subscription to the **RAINBOW** a magazine devoted entirely to the TRS-80 Color Computer
- 3.) Use of a library, with books programs & rompacks that you may check out and use for up to four weeks at a time.
- 4.) A club newsletter, with tips programs and data on CoCo.
- 5.) Buy, sell or trade with your ad in the newsletter **FREE**
- 6.) Discounts on many software & hardware items for CoCo. Save from 7 to 80 percent.
- 7.) The new member package, containing many helpful items.
- 8.) Discounts on subscriptions to CNN and chromasette mags.
- 9.) You may borrow parts for the Color Computer from the club and return them when you get the ones you ordered from RS this will save you down time
- 10.) You will have someone to ask about problems with software or hardware. Many members are master programmers, some are electronics experts.

The East Texas Color Computer Club
2101 E. Main St., Henderson, Tx. 75652

R. S. COLOR DISK SYSTEM SOFTWARE

DISK EDITOR/ASSEMBLER - This package includes a full featured disk based text editor program and a disk to disk/tape/memory assembler. The text editor is an easy to learn full featured editor which allows files larger than memory to be created and edited with ease. It is compatible with ASCII formatted tape & disk files to allow easy conversion of tape based programs. The assembler supports the full 6809 processor instruction set and will cross assemble 6800 code to 6809 object code. The output object file can be directed to either disk, tape or memory with overwrite protection. The object listing can be output to the screen or printer and versions for printers with or without line feeds are provided. **DISK EDITOR & ASSEMBLER \$79.95**

DISK TERMINAL PACKAGE - A disk based Terminal program for your color computer features full text buffering, baud rates from 300 to 9600 baud, programmable word length, parity bits odd/even/none, stop bits. The buffer size is automatically set to the maximum size of your memory. Full control codes can be sent, display word wrap is automatic. The text buffer can be saved or loaded from/tape or disk. The contents of the buffer can be sent as a file with automatic re-entry to terminal mode, also a file can be sent directly from disk to another user. The contents of the buffer can be displayed on the screen or optionally be output to a printer plugged into the RS 232 port. All file formats are directly compatible with our text editor and word processor programs. **DISK TERMINAL PACKAGE \$49.95**

TEXTPRO I DISK TEXT EDITOR/WORD PROCESSOR - is a complete word processing system designed for easy learning and use. It features a disk based text editor for editing files larger than memory and direct processing of text files from disk or memory. Some of the editor commands include: copy, move, search, replace, delete, line & automatic edit modes allow easy logical commands to add, change, insert, delete, skip up/down line, ignore changes made on last line, skip to begin/end of line all with easy single keystroke commands using arrow keys. The editor can also load, save and append tape or disk files for easy conversion of existing ASCII text files. The Word Processor includes over 29 commands for formatting the output, some of them include: page length, page mode on/off, page numbers on/off, left margin, top/bottom margin, line length, center, double width print, single, multiple & special indent, text lines left on page, skip to top of page, send control codes & ascii data for special printer control, justify on/off, page heading, multiple footnotes per page, word fill mode on/off, send message to screen, display & input from keyboard and more. This is an excellent word processor with many advanced features and one of the easiest to learn and use in just minutes. All commands are logically oriented in easy to remember and associate 2 character commands. **TEXTPRO I \$49.95**

TEXTPRO II TEXT EDITOR/WORD PROCESSOR - Includes all the features of TEXTPRO I plus 10 programmable tab stops, can be used with horizontal tab to next location, center over tab column, decimal alignment on tab column, right justify to tab column, tab to programed column. Also tab commands can use specific values for tab columns or programed values. Other additions include: character fill, right justify line, programmable footer can be centered/right justified/double width or almost any processor commands can be used with it, 3 programmable header lines, expanded footnotes and processable keyboard input data during word processing. **TEXTPRO II \$79.95**

5568 Ricoschat Avenue
Las Vegas, Nevada 89110

CER-COMP
(702) 452-0632

All Orders Shipped From Stock
Add \$1.00 Postage - MC/Visa Add 3%

A 21-17

80-U.S.

THE TRS-80 USERS JOURNAL

If you own a TRS-80® Model I, Model II, Model III, the Color Computer, or the new Pocket Computer, YOU NEED 80-U.S.!

The 80-U.S. Journal has

programs for your enjoyment and enlightenment. Every issue contains several Basic or machine language program listings. It contains Business articles and program listings. No matter where you are, there is something for YOU in the Journal!

and...

The Journal contains reviews of hardware and software. Our "Evaluation Reports" will help you make the best choice in selecting additions to your system.

Save Over 50%

You can save over 50% off the cover price of 80-U.S. Journal. For the remarkably low price of only \$16.00, a savings of \$20.00 (cover price), you will receive a wealth of useful information every month. As a special **BONUS**, if you enclose payment with your order, you will receive an extra issue for each year of your subscription order. Order three years of 80-U.S. and receive three extra issues! At no cost to you!

Is your
TRS-80
Lonely?

Write today for
our

"No Risk Offer"

SEND TO:

80-U.S. Journal
3838 South Warner Street
Tacoma, Washington 98409
Phone (206) 475-2219

Name _____

Address _____

City _____ State _____ Zip _____

Visa/MC _____

Exp. Date _____

☐ 1 yr. \$16 ☐ 2 yrs. \$31 ☐ 3 yrs. \$45

Please allow 6 to 8 weeks for your first issue.

TRS-80 is a Registered Trademark of the Tandy Corp.

PRICKLY - PEAR SOFTWARE

QUALITY PROGRAMS FOR YOUR 16K EXTENDED COCO

Starfinder

This astronomical "star" computes the current sidereal time, and converts declination and right ascension to altitude and azimuth — or the other way around. Just enter your latitude and longitude, and the time of day. We include instructions to help you equip your dobsonian or tripod with setting circles. Quit wasting your time looking, and spend more time seeing. **\$19.95**

Household Helper

Actually five programs from one CLOAD, and you choose the one you want from the menu. You can do Metric conversions, adjust recipes to serve more or fewer people, figure gasoline costs, keep a data file of bills coming due, and you even get a stopwatch/timer. Full instructions. We probably should charge more! **\$14.95**

Mathpac I

Finally! A totally flexible, menu-driven set of elementary math programs for the color computer! **MATHPAC I**, developed and tested by an elementary teacher in his own classroom, allows the user to choose the operation (+-*/), difficulty level, number of problems, and a drill or testing format. This program employs sound educational principles, and even includes suggestions for classroom use. **\$19.95**

Football

A strategy version of America's game. The offense and defense enter their plays, and the results (different each time) are calculated and displayed on the scoreboard. Will they run up the middle or throw the bomb? Are they playing the prevent, or will they blitz? 36 different play combinations provide over 200 possible play outcomes, not counting the variables for yardage gained or lost. Intercept, fumble, blitz, punt, and kick field goals. Even an occasional long run or punt return for a touchdown! Be aware, this isn't another arcade wonder to see who's faster on the joystick, but all you sideline coaches are going to love it. **\$16.95**

Viking!

A simulation for 1 to 4 persons. Each begins as a landowner, and by farming their land, buying and selling land, expanding their fishing fleet, building on to their manufactory, increasing their population, equipping and training more soldiers, and regulating their taxes, each player tries to increase their economic power and rank until one becomes ruler over all. But beware plagues, rats, raiders, revolts, bad weather, and other misfortunes which may lie along the road to success. As you progress, see the map of your holdings increase. Playable in 1 to 2 hours, and different every time, you may have an addiction problem. **\$19.95**

NEW THIS MONTH

Fantasy Gamer's 32K Package

Similar to our popular Fantasy Gamer's Package, but both the Rooms and the Character & Monster Generator are in memory at the same time. You make your selection from a menu. In addition, you can select the **Dice Bag**, which will roll just about any probability you need. **\$24.95**

Ancient Wisdom Trilogy

Three programs, each drawing on the historical wisdom of the ages.

TAROT Ancient Egyptian deck of cards may reveal much. You can read past/present/future, circle of life, or ask a specific question. Lots of documentation. **\$17.95**

I CHING A Chinese wisdom so old its very origin is shrouded in the mists of time. The ancient Chinese oracle will give an answer to your question. What will the hexagram reveal? **\$16.95**

NUMEROLOGY What can be learned from the numbers? Do a character analysis, read your destiny, or chart your monthly cycles. **\$14.95**

All of these come with ample documentation — ready to be used immediately. **ALL THREE** for just **\$39.95**. Save \$9.90 over separate prices.

The Great Word Game

Perhaps the best word game ever for Coco. There's great graphics, music, and crisp formatting. Plenty of on-screen instructions. Two to four players compete. If you like Scrabble® and Probe® you'll love this one. **\$19.95**

Fantasy Gamer's Package

Two programs: The first will display your choice of 99 different rooms in Hi-Res graphics at the touch of a key. All standard sizes, plus some with pools, pillars, stairs, odd shapes, etc. Saves lots of game time spent describing room sizes, shapes, and door locations. Includes a super fast dungeon designing system and a completely keyed sample dungeon module — ready to play. The second program in the package generates **COMPLETE** characters including abilities, race, classes, hit points, age, thieving skills, much more, and also generates monsters. This package was developed by an active DM, and has been tested in his campaign. 20 pages of documentation. **\$19.95**

Notice:

It is our policy never to advertise an item unless it is already in our inventory, and ready to be shipped.

SEND A LONG S.A.S.E. FOR COMPLETE CATALOGUE

CASSETTE TAPE: Best quality Agfa tape in distinctive 5 screw shells. Stainless steel guide pins. C-12's - \$8.50 Doz. Add \$1.50 per dozen shipping.

Your Personal check is welcome - no delay. Include \$1.50 shipping for each program ordered. (Shipping free on \$50.00 or larger orders). Az. residents add 6% sales tax. Orders shipped within two days.

Send Order To: **PRICKLY-PEAR SOFTWARE**
3518 S. Randi Place
Tucson, Arizona 85730
(602) 886-1505

Probe® is Reg. T.M. of Parker Bros. Scrabble is Reg. T.M. of the Production & Mkt. Co.

Special Feature...

PRINTERS: AN OVERVIEW OF SOME FEATURES

By Lawrence C. Falk

Printers seem to be the most widely wished-for and, yet, most misunderstood thing you can attach to your 80C.

By far the most common subject of letters to the RAINBOW is the printer -- ranging from comments about a specific printer to questions (and questions and questions!) concerning how printers work, why they don't work and so on.

We're looking at this Special Feature to be a part of the RAINBOW on a fairly regular basis. Sometimes I'll write it (I'm into printers), and sometimes we'll let another person do the honors. We'll also ask for some cooperation from some of the printer manufacturers for some in-depth looks at the most common printers which can be attached to the 80C.

Judging from our correspondence, the most misunderstood thing about any printer is how to get all the goodies that the printer manual may specify you can use with a particular model. These frustrations seem to run the gamut from "special" character sets to dot matrix graphics. There is also a lot of confusion about how you "make" a printer do such-and-such. We'll try to clear up both of these things this month.

We've got to get a little technical to explain. First of all, there are, essentially, two kinds of printers -- intelligent and not-so-intelligent. The Line Printer VIII, the Epson MX-80, and the Microline 83A are examples of intelligent printers. The Line Printer VII is non-intelligent.

When we say a printer is intelligent, we mean that it has its own chips that translate signals and tell it what to do. It may, however, do some internal things with those chips as well -- such as count lines for a top of form (to roll the paper up to the top of a new sheet). Printers like the LP VIII and the MX-80 have a whole range of things they can do. A printer like the LP VII cannot do much more than print in regular and double-wide characters.

Oops. Before you take me to task on that one, I know that the LP VII

has dot-addressable capabilities. And, for the price, they make it one of the best printers on the market.

But LP VII is not really intelligent in the sense of some of the others which are available. For the purposes of this, however, all of that is beside the point (we'll talk about differences in printers in more detail another time).

What you have to know right now is that most of these printers -- from the smartest to the less-than-Einstein's -- all receive a signal from the computer telling them to print something. And, all this -- as is most everything the computer does -- is in the form of binary numbers. You know, those 1's and 0's that are a computer's "native" language.

There are only a limited number of ways to combine 1's and 0's. And, if you are using just seven of them, that limit comes after 127. Look on pages 184-187 of *Going Ahead...* and you will see that the binary number for 0 is the same in the last seven places as the binary number for 128.

With the 1.0 ROM in the 80C, the computer only sends seven bits to the printer. So, if you tell 80C to send a code to print a British pound-sign (decimal 193) to the printer (by typing PRINT #-2, CHR\$(193)), your printer will happily comply and print out an "A". But, an "A" is decimal 65, right? Right. Now look at the binary numbers. If you ignore the leading bit, the "A" and the Pound symbol are the same.

Since the 80C with the 1.0 ROM only sends seven bits, there is no eighth bit. That means the printer doesn't know which one you mean and, being confused, figures anything it does not see isn't there. That means it interprets the "nothing there" for a 0, and you get an "A".

Yes, the Pound symbol is "in" the printer, but the 80C isn't telling it to print it.

But you can, yes you can, solve this problem. Radio Shack has a program called an eight-bit driver which will add that eighth bit to the code the 80C sends to the printer. And, even better, it is free! Just ask for the PTFX program. (By the

(Continued on next page)

PRINTERS (From Page 21)

way, the Radio Shack SCREEN PRINT program has its own eight-bit driver.)

Once you load the eight-bit driver into the 80C (it is in machine language), you will send eight bits to the printer. Send a CHR\$(193) and, if you have a LP VIII, you'll get a Pound symbol.

Ah, but now...how do I get my MX-80 to print out dot graphics like the screen print routines I see in the RAINBOW?

The answer is that you don't. Not with the Radio Shack SCREEN PRINT program, anyway. Because, in addition to using the eight bits, the LP VII and LP VIII have different codes telling them to go into dot graphics than does, say, the MX-80.

The Radio Shack SCREEN PRINT program will work fine on a Radio Shack printer. But the commands are not the same for another printer and it won't work.

By way of illustration, try sitting down to an inferior computer -- such as, say, an Apple II -- and typing in some sort of command like LINE (28,32)-(133,77),PSET. Doesn't work, does it? That is because the LINE command isn't part of the Apple's BASIC vocabulary. And, the

instructions which tell the LP and LP VIII to print graphics are part of the MX-80's vocabulary either.

With an eight-bit driver, you can do dot addressable graphics with the MX-80. But, you will have to program it by hand (at least, until someone writes a program to do it for you).

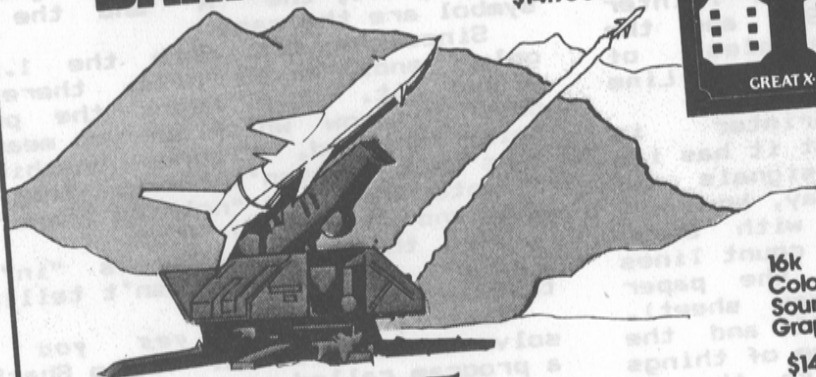
By the by, the 1.1 ROM does put out eight bits, so you don't need a driver.

Finally, remember that both the LP VII and the LP VIII can be switch-selected to be eight or seven bit machines. You have to have the switch set to the proper place before you can send eight bits.

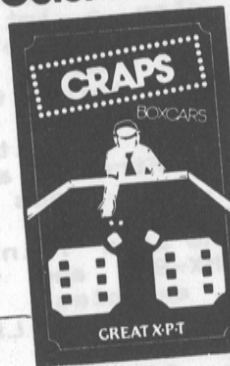
And, for that matter, both will receive either serial or parallel signals -- while the MX-80, off the shelf, is a parallel-only printer. The 80C sends serial signals to a printer.

With the MX-80 (and other printers that are "parallel only"), you can overcome the problem in two ways. One is to buy a special board from the printer manufacturer (many computer stores which carry 80C products can either stock or get these) or you can buy a converter that will change the serial signals from your 80C to parallel. Both the Microworks and Micro Labs carry these converters.

NEW!

From GREAT X-P-T
for TRS 80 Color ComputerMISSILE
BARRAGEColor Sound
High Res. Graphics
Req. 16k Ext Basic
\$14.95 ea.

GREAT X-P-T

P.O. Box 9212
Livonia, Mi. 48150FOR THE
GAMBLER
16k Ext Basic
High Res. Graphics
Play Alone
or Against
Your Friends
\$14.95 ea.16k
Color
Sound
Graphics
\$14.95 ea.

GREAT X-P-T

Mich. Res. add 4% Sales Tax
C.O.D. add \$1.00

FREE CATALOG AVAILABLE

SPECIAL BUY... ALL THREE FOR \$39.95

TRS-80
COLOR
COMPUTER

Starting A Series...

THE COLOR COMPUTER PREDICTS THE NFL!

JUNE, 1982

\$2.50

the RAINBOW

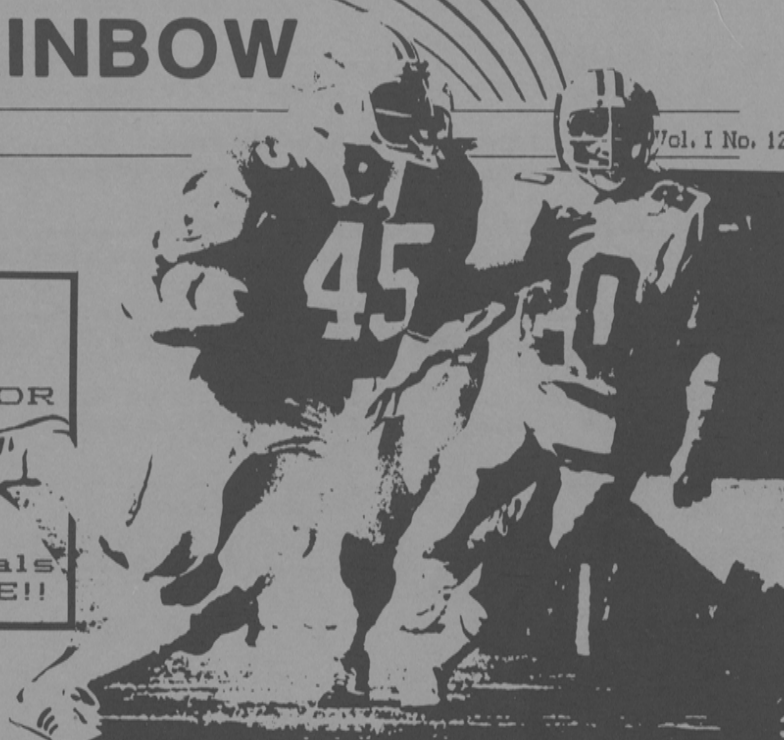
The Monthly Magazine for Color Computer Users

Vol. I No. 12

Under the RAINBOW

Swamp and Ice Games
Using SPECTACULATOR
Printer Mysteries
Reviews

More from PMODE4
Computer Star Map
Hints, Tips, Tutorials
And...MUCH MORE!!



Special Utility...
A Universal Data Base

PLUS...
Assembly Language Column
Fantasy Game Aids

Editor's Notes...

PRINT #-2,

This issue completes one whole year of publishing the RAINBOW.

We won't go into a lot about it all this time out, because we consider our July issue to be the "official" anniversary issue. While you will see some changes in this month's edition, we hope and are now planning for some more next month. All we can say is watch for them. We hope you will be pleased.

You read here last month about

some preliminary plans for the RAINBOW's new Seal of Certification. Those plans are coming into being now, and we call your attention to the inside of this month's issue, where full details are given. We have received a great deal of good comment from you, our subscribers, and from many of the vendors too, about the Seal program. We hope you will take a moment or two out to look at the article about the Seal. The entire program was

(Continued on Page 3)

- 12 80C PICKS THE NATIONAL FOOTBALL LEAGUE.....John Waclo
*First in a series in which you will be able to use your 80C
to predict the outcome of this year's games.*
- 21 PRINTER FEATURES EXPLAINED.....Lawrence C. Falk
Some of the bigger mysteries made simple.
- 25 ICE LANDER.....Ted Shorter
A 13-year-old's lunar lander-like game.
- 28 THE RAINBOW SEAL OF CERTIFICATION.....Staff
Details of this new consumer protection program.
- 31 SPECTACULATOR AS CHECKBOOK-KEEPER.....Dick White
The way to make this program work on your finances, quickly and easily.
- 42 GETTING MORE OUT OF PMODE 4.....H. Allen Curtis
Yes, Virginia, there are more colors in the highest resolution.
- 49 SWAMP WARS.....Fred Scerbo, Robert Doppert & Dale Haggerty
Win your Croix de Lillypad in this game.
- 57 UNIVERSAL DATA FILE.....Jorge Mir
You are going to get organized!
- 58 STAR CHART.....Ray Moses
A heavenly program.

R E V I E W S

Auto Run.....52
Blackjak.....66
Biorhythm.....52
Compuvoice.....11
Date-O-Base
 Calendar..... 9
Disk Doctor.....23
Football!.....23
LCA-47.....62

Lowerkit.....62
Newtalk.....11
Paper Porter....54
Red Baron.....17
Sisi.....23
The Solution.... 8
Soundsource.....11
Space Invaders.. 8
Venturer.....40

-- DEPARTMENTS

- Assembly Corner..... 6
Dennis Lewandowski
- Back Issue Information.....29
- Fantasy Games.....38
Bill Nolen
- Letters To RAINBOW..... 4
- Pipeline.....36
- PRINT #-2..... 1
Editor's Notes
- Submission Guidelines.....33

the RAINBOW
PUBLISHED BY FALSOFT, INC.
5803 Timber Ridge Drive
Prospect, KY 40059

Entire Contents © by FALSOFT, INC., 1982
LAWRENCE C. FALK — Editor

The RAINBOW is intended for the personal use and pleasure of its subscribers and reproduction by any means is forbidden. Use of programs and information herein is for the single end use of purchasers and any other use is prohibited.

TRS-80, Color Computer and Extended Color Basic are trademarks of Tandy Corp.

All programs herein are distributed on an 'as is' basis, without warranty as to suitability for any purpose.

Subscriptions to the RAINBOW are \$16 per year in the United States. Canadian and Mexican rates are \$22 per year. Surface mail to other countries is \$31, air mail to other countries is \$49. Non-U.S. rates are higher due to postage costs alone.

Limited back issues are available for \$2 each for issues 1-7, \$2.50 each for issues 8 and upward. Shipping and handling costs of \$2.50 per order must be added.

Payment accepted by cash, check, money order, VISA or MasterCard in U.S. funds. Please include account number, expiration date and your signature when using bank cards.

The RAINBOW is published every month of the year.

PRINT #-2

(From Page 1)

designed with you in mind.

While on the general subject of advertising, we do want to again encourage you to let our advertisers know you "saw it in the RAINBOW." Our first edition was four photocopied pages. This month's is well over 60. The plain truth is that growth of that sort -- and the ability to deliver more information to you on time every month -- is dependent on advertising. We can continue to grow, and to provide you with more information, only as our advertising grows. So, do patronize our advertisers -- and be sure to tell them where you read about it. We admit that helps us, but it helps you, too.

Big news! As part of the special Adventure edition we are preparing for the fall, we will have an Adventure Contest. First prize is guaranteed to be no less than \$100 (we're still working out prize details).

In order to be eligible for the contest, you must write an Adventure game, submit it on tape or disk, and it must be received no later than September 1. All programs become the property of the RAINBOW, of course, and the winning Adventure will be published in the RAINBOW, along with information about who the winner is.

Do not submit any Adventure that is commercially available. And, there will be several prizes, so you don't have to win it all to get something out of this. As we mentioned, there will be further details on the prizes later.

In the meantime, watch for some help in writing Adventures. But remember, the program has to be an original creation of your own (no adaptations) and you will be disqualified if we get an error message of any kind while running the program. So debug your submission thoroughly.

The Adventure you submit may be word-oriented or graphic-oriented (or a combination of both). It can have any theme and must, of course, be written for the 80C. Also, when making your submission, be sure to include your name, address and phone (we have to know where to send the prize) and tell us how big a system is required to run the program. Please supply instructions and a hard copy listing as well.

Finally, we want to emphasize two things again. First of all, we welcome your letters -- be they of

praise or criticism. We want to continue to put out the finest computer magazine available and we can only do that if we are responsive to what you want. And we do listen. The little boxes which appear in this issue for the first time with system requirements for programs are the result of reader requests. So is the Table of Contents which first appeared last month.

Second, please remember the RAINBOW is dedicated to the betterment of the 80C. One of the things we think helps a lot are Color Computer Clubs or Special Interest groups. We'll be most pleased to give information on how other 80C owners can contact a club if you will just ask us to do so in writing.

Last but not least. Since summertime is a "moving experience" for many of you, please be sure to inform us well in advance of your new address, including ZIP code. We'll make the change as quickly as possible, but if you delay, you may miss an issue. The Postal Service will not forward bulk rate mail.

FREE GAME --- BREAK OUT

SEND A S.A.S.E. FOR A FREE LISTING OF THIS PROGRAM. WRITTEN IN MACHINE LANGUAGE. VERY FAST, HAS ON SCREEN SCORING, ETC. NEEDS JOYSTICKS. COMES WITH COMPLETE INSTRUCTIONS ON HOW TO ENTER IT AND RUN THE GAME.

THE SOLUTION --- \$12.95

THE SOLUTION SOLVES THE PROBLEM OF THE COLOR COMPUTER'S SMALL SCREEN SIZE. FEATURES INCLUDE:

- 1- FULL ASCII CHARACTER SET
 - 2- LOWER CASE CHARACTERS WITH DECENDERS
 - 3- 42 CHARACTERS X 21 LINES DISPLAYED
 - 4- USER MAY HAVE TEXT AND GRAPHICS AT THE SAME TIME
 - 5- INTERFACES DIRECTLY WITH BASIC
 - 6- PRINT-OUTS AT OVER 500 CHARACTERS PER SECOND
- WRITTEN IN MACHINE LANGUAGE. CAN BE SETUP ANYWHERE IN MEMORY. THE PROGRAM CAN BE SETUP TO PROVIDE 4 LINES OF TEXT AT THE BOTTOM OF A GRAPHIC SCREEN.

GRAPH LABEL --- \$8.95

ALLOWS THE USER TO PLACE CHARACTERS ANY ON A GRAPHIC SCREEN. CAN BE USED TO LABEL HIGH RES. GRAPHICS. FULL CURSOR CONTROL, MOVE CURSOR ONE CHARACTER BLOCK OR ONE PIXEL AT A TIME. HAS FULL ASCII CHARACTER SET (508 DOT MATRIX), SUBSCRIPTS AND SUPERSUBSCRIPTS, AND USER DEFINED CHARACTERS. CAN BE USED AS A SUBROUTINE OR STAND ALONE, WORKS WITH ALL 2 COLOR GRAPHIC MODES.

C.C. PILOT --- \$5.95

IMPLEMENTATION OF PILOT FOR C.C. HAS STANDARD PILOT INSTRUCTION WITH EXTENSIONS FOR C.C. INCLUDES TEXT EDITOR AND INTERPRETOR IN ONE PACKAGE. COMES WITH MANUAL AND DEMO PROGRAMS. 4K-14K-ALL BASICS

SUPER PILOT --- \$9.95

PILOT FOR EXTENDED BASIC. MANY NEW FEATURES FOR GRAPHICS AND SOUND. PSEUDO COMPILED FOR FASTER PROGRAM EXECUTION. MANUAL & DEMO PROGRAMS

ART EDITOR- \$9.95 --POOR MAN'S VERSION OF SHACK'S "ART GALLERY".

DOUBLE SIZE SCREEN PRINT- \$3.95 --CREATES A SCREEN PRINT 6.4 X 8.1 INCHES. MUCH NICER THAN RADIO SHACK'S PROGRAMKLP-VII OR VIII REQ.)

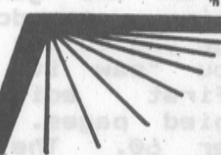
FAST GRAPHICS PACKAGE- \$4.95 --A MACHINE LANGUAGE PROGRAM THAT EXECUTES WITH TWICE THE SPEED OF EXTENDED BASIC. HAS LINE DRAWING PIXEL SETTING, AND SCREEN CLEAR ROUTINES. RUNS ON ALL MACHINES. GIVES 4K USERS A 128X64 GRAPHIC DISPLAY.

CALL PROGRAMS FOR 16K-EXTENDED BASIC UNLESS OTHERWISE NOTED

SHAKE MOUNTAIN SOFTWARE
P.O. BOX 3722
RALEIGH, NC 27650

TERMS-CHECK OR MONEY ORDER ONLY. INCLUDE \$1.00 FOR ONE PROGRAM, \$2.00 FOR MORE THAN ONE PROGRAM FOR SHIPPING.

LETTERS TO RAINBOW



MESSED UP LETTER

Editor:

You published my letter in the April RAINBOW under the heading "More Random Thoughts." However, there is a typographical error in line 40. As published it reads "40 IF A<1 THEN GOTO 30". It should read "40 IF A<2 THEN GOTO 30". It makes no sense the way it was published.

Rita Lawry
Cleveland, OH

PLEASED

Editor:

Firstly, let me say I enjoy your publication very much. It would like to see more programs in it for non-technical users like myself who don't have printers, disk drives and just want to play.

I would like to tell you about one of your advertisers, Spectral Associates of Tacoma, WA. A while ago, I wanted to upgrade my 16K to 32K so I bought their "Ramcharger." When I received the board, I followed their simple instructions carefully, but the board would not seat right in my 80C.

I talked to the technicians at Spectral and, though they were very helpful, I still could not get the board to seat because of one of the components of my machine. Apparently when my machine was put together, the component was installed abnormally higher and, through no fault of Spectral's, the Ramcharger would not work.

With all the disclaimers associated with the software and hardware industry, I expected I would either have to take the computer to the Radio Shack service people to have the problem corrected at my expense or give up the idea of installing my own upgrade. I sent the board back to Spectral explaining the problem, and four days after I mailed it to them I received back another board designed and built expressly for my particular computer.

I easily installed the board and it works perfectly. In my opinion Spectral went far above and beyond in dealing with my dilemma and I would like to commend them and recommend them to your readers.

Bob Symonds
Manchester, CT

CLUBS

Editor:

We are a new club whose primary interest is the 80C. We are just getting started.

Anyone interested can contact Andrew Thomas, 2804 E. 55th Place, Suite Q, Indianapolis, IN, 46220.

Andrew Thomas
Indianapolis

Editor:

We have started an 80C group here in Indianapolis with about 15 members. Those interested can contact Robert Carr, 1937 N. Emerson Ave., Indianapolis, IN, 46218.

Robert Carr
Indianapolis

Editor:

We are starting a Color Computer Club in Columbus, OH. So far, we have about 20 people who are interested. Surely there must be more people in the central Ohio area who have or are interested in purchasing an 80C. Anyone interested can call Susan Davis at (614) 861-0565.

Thank you for passing along this information.

Susan Davis
Reynoldsburg, OH

MX-80 GRAPHICS

Editor:

I too, like George Klement of Grandview, MO, have a 32K Extended 80C using Computerware's upgrade kit and an Epson MX-80. I am finally able to print graphics.

I am interfacing the Epson with MicroWorks' PI80C. I have an older 80C with the 1.0 ROM. After spending considerable amounts of money for all this hardware, I thought I could hook it all up and get it to work.

After many phone calls, and genuine interest from the people at Micro Works, I found out what was needed to make it happen.

First of all, the Radio Shack Screen Print program does not enter the picture. One does need the PTFX16 program that Radio Shack supplies for free, and a special driver program that was supplied, in this case, by Micro Works. First you CLOADM the PTFX, the CLOAD the driver routine (it is in BASIC) and then

create your graphics program before the driver. Voila! Graphics to the printer.

Also, I agree with Glenn Knight, Glen Burney and Jim Rauh about the content of articles and advertising. There may be some wizards out there too, but it is the user who is the focal point of software and hardware support.

Finally, Norman Place of Florida: I'll be right behind you ordering a good music composer program if, indeed, someone invents one.

The truth of the matter is I am thrilled with the progress that 80C supporters have made in the last year and my complements to the RAINBOW for doing such a wonderful job.

Bob Safir
Los Angeles, CA

GENERAL HELP

Editor:

Its not completely clear to me what Edgar Poulin is asking for, but he can set the printer width by POKEing the number of columns into 155. Perhaps he was the victim of the typo in the Extended Basic manual where it says 115. If he wants something else, he can get in touch with me at 291 South Main St., Andover, MA, 01810.

Likewise, I am not sure exactly what Ralph Coleman is referring to. If he can't get the sample programs on page 162 to run, either he is doing something fundamentally wrong or he has a defective ROM. Two minutes with a Radio Shack salesman should resolve which. If he is trying to get assembly code to run, he could have a plethora of problems. The most likely is he is zapping a machine register used by BASIC. My recommendation is he start his code by pushing everything but the program counter to the stack (PSHS U, X, Y, DP, B, A, CC) and exit by pulling everything (including the program counter, PC) from the stack.

In reference to SPECTACULATOR, I agree it is super, but I'm discovering some design peculiarities. Among those I find most irksome are lack of tape positioning capability, the fact that the formatting capabilities are not a little more sophisticated and the way formulas are handled. Overall, except for

tape positioning, I think it is a well thought out and well implemented product that is very useful.

Don Kenney
Andover, MA

(EDITOR'S NOTE: See the special article on SPECTACULATOR by Dick White in this month's issue. More of these are forthcoming.)

COLORFUL SCREEN

Editor:

Do you hate looking at the same old green screen of the 80C?

Have you noticed that when you use the SCREEN command that, unless you use it in a program, the screen it produces only blinks on?

Try this yourself: Type in SCREEN 0,1. See that the screen stays pink for only a split second. Well, I did some messing around with POKEs and found that if you POKE 359,13 and then use screen commands like SCREEN 0,1 the screen produced is permanent (unless you press RESET or do the remedy POKE, POKE 359,126).

A lot of people think they know the best way to PCLEAR0. I am one of those people. The best, shortest and easiest way is POKE 25,6:POKE 31,6. It does not clear the program from memory. Location 26 (and 26) contain the location of the beginning of the BASIC program and location 31 is the same, except it is used for the NEW command.

Roger Cauvin
Austin, TX

SECRET PROGRAM

Editor:

I came up with a "secret program" routine. Its fun. You can have hidden lines or make a listing appear what it isn't.

Try this:

10 FOR Y=100 TO 110: followed by 19 asterisks and then 10 FOR X=1 TO 8
20 SOUND Y,10: followed by 14 asterisks and then 20 CLS(X)

30 NEXT

1 D=256:peek(25)

2 FOR Y=D TO D+200

3 IF PEEK(Y)=42 THEN POKE Y,8

4 NEXT:DEL -5

When run, 80C starts before the program and checks for asterisks. It replaces each with a backspace (ASCII 8). Although it runs a sound program, a listing shows a clear screen in eight colors.

Mr. Poster

S. Hackensack, NJ

PROGRAM CHANGE

Editor:

Thank you for the review of our program, *NONEY NINDER II* in the

April issue. And thank you for a really excellent magazine.

Because of the review, we have re-written the documentation for *NONEY NINDER II*. We have also made a couple of changes to the program which allow greater operator convenience.

Jay Hoggins, Harmonycs
Salt Lake City, UT

SOUND ADVICE

Editor:

My first *RAINBOW* arrived today. I love it. Its so nice not having to check everything before I read it (to throw out the bad apples, if you know what I mean). Just don't forget about us poor relations struggling along with 4K.

Thanks to Cameron Price for his AUDIO ON advice for CSAVEing a program. I lost a lunar lander program by forgetting to push record and then clearing memory to check my tape.

There is an error in Line 50 of MY OWN MONEY #3. It should be JJ=AW-1T. Otherwise you are told your taxes instead of your refund.

Dennis Church
Collinsville, IL

GETTING TOGETHER

Editor:

I would just like to let you know how much I enjoy your magazine. I have had my 80C for about 20 months now and have been starving for more information. Your magazine satisfies most of that need.

I converted my 80C to 32K myself and had the same problem as James Richter. I had a bunch of 4K programs that were too much trouble to load but I didn't want to throw them away. So, I came up with this method for merging programs together.

To start, turn the 80C on and enter PRINT PEEK(25),PEEK (26)

If you do this before you run any programs or clear any memory, decimal address 25 should contain a decimal 30 and decimal address 26 should contain a 1. Now CLOAD your first program and renumber it if necessary. Then, enter the following command: POKE 25,PEEK(27);POKE(26),PEEK(28)-2

This sets up pointers to the end of the previous program and prevents the next program from being loaded on top of it. Now you can CLOAD another program. For each program that you want to merge, simply POKE the addresses as above and then CLOAD and renumber it so that the first line number is higher than the last line number of the previous program. A

PRINT MEM command will show you how much memory is available.

When you have CLOADed the last program, enter the following command: POKE 25,30:POKE 26,1

This sets the pointers back to the start of the first program. Your programs are now merged. By renumbering them and adding a menu, you will have merged several programs and made them work as one.

One word of caution: If you merge programs and use DATA statements or the same variables your programs may go bananas if you don't change them. Also, do not try to run programs while doing this.

This method is more simple than the one mentioned in your Letters column previously and will save wear and tear on the cassette cable, too.

Dennis Weide
Albuquerque, NM

(EDITOR'S NOTE: This routine was published in one of the earliest editions of the *RAINBOW*. We're running this letter because Mr. Weide obviously discovered it independently and, since we have so many new readers, we thought it would be helpful to do this again.)

HARDWARE MAN

Editor:

I have to take umbrage with Jim Rauh's remark in April. I am a Hardware Man and have been since my cruise in WW II as a Navy Electronics Technician. From my talking with others I know there are a lot of us hardware types in the 80C ranks.

We hardware men do have a real area of interest in common with Mr. Rauh and his "novice and semi-technical types." We, like you, would love for someone to help us learn to operate and use this lovely piece of machinery.

For instance, I have one of the very first 80C's. I also have one of the first LP VIII's. But, there is not one place in either of the 80C manuals or the LP VIII manual that shows a written program of how to have these two units function together.

I can't close without saying a good word for Dave and his gang at *Chromasette*. The programs and games on his tapes have helped me learn more about 80C than all the non-info in both manuals that came with the computer.

Russell Hokanson
Covina, CA

the ASSEMBLY CORNER

By Dennis S. Lewandowski
Rainbow Columnist

This month I would like to start the column with a small observation I have made. It seems almost every magazine concerned with the 80C has begun a series of articles concerning Assembly Language. It would seem that the question would come up of which is the best series to follow.

Well, putting in my two cents worth, I would say ALL of them. No two people share the same exact experiences or writing style. Therefore, if you are serious about gaining information about this subject, read and try all sources available. I know I do.

Before we start, let's all open to page 271 of *Getting started with COLOR Basic*. Here we have what is called a "Memory Map" of the inner workings of 80C. The addresses of the items listed on this page are in both hex and decimal. I will always refer to an address on this map in HEX. I will also use a dollar sign to denote the address as Hex. The "\$" symbol is used by most editor/assembler packages to represent Hex.

Now to the task at hand, Indexed Addressing. This has to be one of

the most powerful, and useful, methods of accessing and using data in the 80C. Let's look over Program Listing #1 step by step and see what's happening.

The first thing we will do is set up our index registers by loading them with the correct areas of memory we are going to use. We'll load the "X" register with \$0400. What's at \$0400? The video display of the 80C. The display occupies \$0400 to \$05FF (or 1024 to 1536 if you insist on decimal). Next, we load the "Y" register with \$A000. At this location we have the start of ROM memory in a non-extended 80C. Now we have two pointers set at different areas of memory -- one pointing at RAM, the other pointing at ROM. Sounds interesting already.

How about that word in the listing "LOOP"? This is what we call a label. Since the assembler does not recognize line numbers, as BASIC does, we have to use labels to identify a particular memory location to the assembler. In the same line, we have LDA Y+ LDA is assembler shorthand for Load A. The comma tells the assembler we wish to use the indexed mode of addressing. The "Y" is, of course, the register we want to use as a pointer. And the plus sign means the Y register will automatically be INCRemented (added to by 1) once the instruction is executed. The same is true of the next line, except this time we are STORE(ing) A in the memory location

PRESENTING JARB...



MYSTERY MAZE

Excellent test of nerves and skill; escape this 3-D maze without touching the electrified walls; lose points if you stop to look at your map; random star locations prevent memorization; play time varies from minutes to hours.

16K EXT.....\$14.95

VAMPIRE

Locked in a 60 room mansion; your only escape is to find and destroy dreaded Nosferatu before sundown; time play averages 6-plus hours.

32K EXT.....\$14.95

JUNGLE TREK

Lost in a jungle with wild animals lurking; your only survival is to find a safe compound before you are lunch for lions; high resolution; multi-color.

16K EXT.....\$14.95

BANDITS/NUMBERS

1) Slot machine simulation; low resolution graphics with sound effects.

16K EXT.....\$14.95

2) Try to guess the computer-chosen number from 1 to 1000 in 10 or less tries; develops mathematical skill.

4K EXT.....Both for \$14.95

LAZER STAR/HELO BATTLE

1) 2 players avoid destruction by blasts of mysterious lazerstar while battling each other for possession of Lazerstar

16K EXT.....\$14.95

2) 1 player/2 joystick combat game to blow up 5 blockhouses while watching fuel, ammo, and avoiding anti-aircraft fire

16K EXT.....Both for \$14.95

JARB CODE

Encode/decode important messages or other information in a virtually unbreakable format.

16K Extended Basic Color Computer...\$15.95

*Atari 800 Disk Version.....\$20.95

BIORHYTHM/PSYCHIC APT.

1) Prints biorhythm charts of nearly unlimited length; attractively formatted for use on Line Printer VII

16K.....\$14.95

2) Your psychic ability is determined through questions evaluating your psychic experiences

16K.....Both for \$15.95

JARB PRINTER UTILITY

Mini word processor containing mailing and cassette label generator; printer test; internally stores up to 1000 x 80 lines of text

32K.....\$20.95

JARB SOFTWARE

1169 Florida Street
Imperial Beach, CA 92032
(714) 429-5516

Dealer/Author Inquiries Invited

*Atari 800 is a trademark of Atari Inc.

**Installation of these items will void the Radio Shack warranty. Radio Shack is a trademark of the Tandy Corp.

16K/32K MEMORY UPGRADE KIT

Hardware and instructions to convert 16K color computer to 32K; minimal soldering required; installs in 30 minutes

\$24.95

4K/16K MEMORY CHIP SET

Eight NEC 4116 200 Nanosecond chips with installation instructions; no soldering; installs in 25 minutes

\$16.95

VIDEO INTERFACE KIT

Brings out composite video signal for interface to monitor; instructions included for external sound.

\$19.95

C-05 AND C-10 DATA CASSETTES

\$.85.....QTY 1-10.....\$.95
\$.75.....QTY 11-20.....\$.80

Call or write for price on larger quantities

DUAL JOYSTICK UNIT (D.J.)

Single unit assembly enhances playability of multi-joystick/player games; convenient press-to-fire buttons.....\$29.95
+\$4.00 Total shipping and handling

All programs warranted 60 days from date of purchase to original purchaser.

Unless otherwise specified, shipping and handling \$2.00 per order.

California Residents add 6% sales tax
COD orders accepted

that the X register is pointing to.

OK. So far, so good. We have taken the contents of memory location \$A000 and Loaded it into the "A" register. Then we Store the contents of the "A" register in memory location \$0400. A few other things have happened as well. After "A" was Loaded with the contents of \$A000, the "Y" register was INCremented by 1. So the "Y" register now contains \$A001. The same follows once the contents of "A" was STored in \$0400, and the "X" register is now at \$0401.

This will help explain the next instruction, CMPX #\$0600. We know, from the memory map, that the screen ends at \$05FF. We should also be aware that if we continue to fill memory with the contents of ROM, we will soon overwrite our program. Therefore since we cannot see (on the screen) what's happening, this is where we will stop this data movement.

By using the CoMPare instruction, we have told the CPU: "HOLD IT JUST ONE NANOSECOND!" We want to see if you've done your job yet. So, being very obedient, the CPU checks the "X" register and sees if it matched the IMMEDIATE data of \$0600. Since this is only the first pass through the program, and "X" contains \$0401, it just continues along its merry way. If it had found \$0600 it would set the zero flag which would say "YES, the 'X' register is EQUAL to \$0600." The following line is a test BEQ DONE. This is a simple example of the LOGIC, or decision-making ability of your 80C.

Branch if Equal or BEQ tells the CPU what you want done with the results of the CoMPare. When the "X" register does equal \$0600, the CPU will add the Program Counter to a predefined number (defined by the assembler when it calculated the Branch), and release 80C from the LOOP we have set up. Kind of remind you of a FOR-NEXT loop in Basic?

The next instruction really makes our LOOP. BRanch Always or BRA LOOP, Branch when? ALWAYS! NO questions asked, no compares, nothing! Just keep going to LOOP. We do want to fill the display screen? So we set up an infinite loop. If not for the compare we did earlier, this program would go on forever.

Well, that's the main body of the program. How 'bout this other stuff? The next line, DONE, is a label, JSR \$A1C1 is a Jump to SubRoutine at ROM location \$A1C1. In a JSR -- Jump to SubRoutine -- the CPU knows its just leaving the main program for a while, and expects to return. (Similar to

Basic's GOSUB command). So the CPU will "STACK" all the registers, perform the subroutine, and return to the program. The real beauty of using subroutines is that you don't have to write all the extra code, which should make your program more compact.

This is a very handy subroutine indeed. It is the keyboard scan routine, without the cursor, kind of an INKEY\$ command for machine language. This next line may be confusing to you. When you jump to a subroutine, you actually are going to another machine language program. The subroutine for the keyboard scan will return a zero in the "A" register if you do not press a key. By using the next line, BEQ DONE, we allow the subroutine to do the CoMPare for us. These two lines will hold the screen frozen so we may look at it until we press a key. Once a key is pressed, the "A" register is loaded with the Hex value of that key and will NOT be zero. Since we have left no other instructions for the CPU, it has no choice but to execute the last line. This is a method of programming sometimes called Fall-Through Programming.

The final instruction returns our 80C to its familiar face, BASIC. JMP \$A027 is a mandatory JuMP to Basic. You'll notice we didn't branch. We could have, if we used the LBRA instruction. But we wanted to show some true end to this program, and I'll try to use as many instructions as possible to get you familiar with them.

Now I can see your getting ready to pull 80C out and try this program so I won't hold you up much longer. We'll continue this topic next month. But before you go, may I suggest you try playing with this short program? That's right PLAY with it. Try things like, leaving the "+" off the LDA ,Y+ instruction, or load "Y" with different value in ROM, or even RAM. How about LDA ,Y++? HMMMMM, could you set this up to search memory for give byte?

We'll see you next month.

	LDX	\$\$4000	Load X with video
	LDY	\$\$A000	Load Y with ROM
LOOP	LDA	,Y+	Load A with Y pointer
	STA	,X+	Store A at X pointer
	CMPA	\$\$0600	Have we filled the screen?
	BEQ	DONE	YES, then DONE
	BRA	LOOP	NO then LOOP
DONE	JSR	\$A1C1	Check keyboard
	BEQ	DONE	No press check again
	JMP	\$A027	GOTO BASIC

Software Review...

THE SOLUTION USES GRAPHIC LETTERS

You can write and PRINT graphic-generated letters on the two-color graphic screens with *THE SOLUTION* (Snake Mountain Software, P.O. Box 5722, Raleigh, NC, 27650, \$12.95).

The name of this machine language program is taken from a desire on the part of some to have a four-line window at the bottom of the screen for words, something like an Apple computer. One of the options is for a four-line scroll at the bottom, leaving the remainder of the screen for true graphics. But, it also takes advantage of the power of the 80C and can print letters and words anywhere on the graphic page.

The display is 42 characters by 21 lines and you can have graphic text and characters on the screen at the same time. There is both an upper and lower case with descenders and the program interfaces directly with BASIC.

It's a nice program which could benefit greatly from better and more detailed instructions. This program works and is a good implementation of an idea. We wish that just *how* it provides *THE SOLUTION* were a bit easier to get at.

There is also one problem of incompatibility between the program and BASIC's ROM, but the fix is easily made and is explained in detail.

Software Review...

THIS SPACE INVADERS IS A GOOD ONE

SPACE INVADERS (by Space Cadet Enterprises, 523 Big Ridge #5, Biloxi, MS, 39532, \$26 cassette, \$29 disk, \$5 discount for cashier's check or money order) is so much like the arcade game that I'm hard pressed to tell them apart. It's in the 256x192 graphics mode with four colors (black, red, blue and white) and has very good sound.

There are 500 speed levels to this game. This gives a lot of variety and easy adjustment to individual tastes and abilities. The first speed setting is very slow, more suited for young children than adults (200 or below are best suited for younger kids). Most arcade games run too fast for children and the ability to slow the game down is a real plus with kids in the house.

The play on the 500 level is blinding and just the thing for someone with overabundant skill

and/or confidence.

On any speed level, there are three speed settings for the bombs. You can raise or lower their speed without changing the overall speed of the game. Too, there are normally three bombs on the screen at a time, but this can be changed to anywhere from 1 to 20. The more bombs there are, the slower they fall and the speed adjustment helps a lot with this.

SPACE INVADERS by Space Cadet needs 16K of memory and will run with either extended or non-extended basic. It is in machine language. Joysticks are not required. My game had an error in it, but Space Cadet fixed it and had a new, error-free version out to me in a week.

There are a lot of invader games on the market, and I can't say if this one is any better than them -- but they'd be hard pressed to keep up with this exciting game.

-- Charles Blakeney

(EDITOR'S NOTE: We took a look at this game independently, and it is one of the best! Very versatile and a great deal of fun to play. We recommend it highly.)



Software Review...

**DATE-O-BASE
CALENDAR WORKS WELL**

If you are one of those people who just *has* to keep track of your time or can't remember a birthday or anniversary date for the life of you, then **DATE-O-BASE CALENDAR** is the answer to many of your problems.

This excellent program (from Custom Software Engineering, 807 Minuteman Causeway, Cocoa Beach, FL, 32931, \$16.95 tape, \$19.95 disk) is a general calendar and date pad system.

You can place up to 12 short memos in any given date between the years 1700 and 2099. They could be "Wife's 30th Birthday" on the appropriate date or "Pay Mortgage" on the first of every month. Once you have these memos input, the program will store them on tape or disk and you can recall them at will.

You also have the option of searching any series of dates for either all messages or for messages of a specific type. This search is fast (especially on the disk version) and totally accurate. By using it, you can call up all birthdays in a year simply by using a key word like "birthday" or you can code in bill-paying needs by recording them with some sort of code like "\$-". Of course, if you start each bill entry with the word "pay," you can simply use that as a keyword.

Just as simply, you can delete memos and, because you can specify which memo position on the screen an individual memo should be located, you can -- if you wish -- allocate the first six slots for morning memos and the last six for afternoon and evening memos.

As a bonus, the **DATE-O-BASE CALENDAR** also does days between dates computations. Moreover, it gives elapsed time in days, days and weeks, months and days and years, months and days. The days and days and weeks automatically account for leap years.

Finally, the program will display an entire month on the graphic screen (which you can print out with a screen print program). And, it alerts you to a particular day which has a memo in it with a marker and a tone.

This offering, which requires 32K and Extended Color Basic, is a first class program.

COLORSOFT™

"Quality Software At Affordable Prices For the TRS-80® Color Computer"

★ Games ★ Educational ★ Home/Personal ★ Financial

We Also Offer: ★ Custom Programming ★ Royalties For Software

★★★ Over 50 Software Items Currently Available ★★★

Documentation and a Limited Guarantee with all COLORSOFT™ Software.

★★★ 4K Color BASIC Programs ★★★

INVADERS: 10 Skill levels, phaser sound and exploding bombs \$12.95
DUMP: Explore the memory of the color computer-output to screen or printer 8.95
TAG: 2 player game of chase. Fast action and fun 10.95

★★★ 16K Color BASIC Programs ★★★

CASINO: One-armed bandit, blackjack, and dice games \$12.95
DISASSEMBLER: Disassemble machine language programs (screen or printer) 13.95
AUTO MINDER: Keep track of fuel usage, tune-ups, oil changes, etc., creates and maintains cassette data files for multiple autos 10.95
ESCAPE: Intermediate advent. with GRAPHICS. Player must find and decipher various clues to escape. Graphics give player the feel of being there (mach. lang. for fast action) 15.95

★★★ 16K Ext. Color BASIC Programs ★★ ★

SASPUS: Beginner's adventure game. Player must find and destroy the 'deadly mutant' in a genetic nuclear research center. Each game randomized \$8.95
PIRATE TREASURE: Advanced beginner's adventure-the player must find the pirate's treasure which is hidden in a cave of over 40 rooms 11.95
ADVENTURE COMBO: Combination of SASPUS and PIRATE TREASURE 16.95
FLIPUM: Color computer version of the OTHELLO type games 12.95
MAILING LIST: Cassette or disk files for names and address with comments. Cross referencing of information and name searches are featured 20.95
PEEK 'N' SPELL: Flashes word or letter on screen for children's spelling drill-New word files can be created and stored on cassette tape 10.95
MATH DERBY: Math drill in a horse race game for 1 to 3 players-variable difficulty 11.95
LOAN: Amortization schedules with breakdown of monthly payments (avail. in 4K) 10.95
STOCK ANALYZER: Keeps track of stock prices and maintains portfolio data base includes additional program for projecting price trends 16.95
COLOR CUBE: CoCo version of the popular cube puzzles. Features include solution by computer and saving partially solved puzzle on tape 17.95
DISK BACKUP: Saves Diskette based programs onto cassette and checks for disk errors 14.95

Send \$1 for catalog containing full descriptions of all available software and receive \$2 discount coupon. Free catalog with an order from this ad.

GOLDLABEL™ BLANK CASSETTES

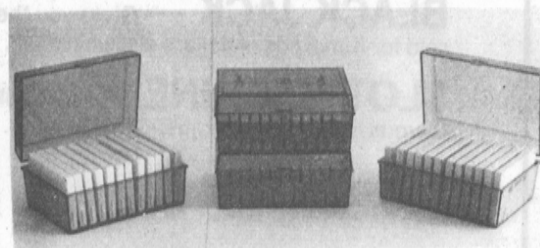
★ PREMIUM 5 SCREW SHELL ★ DIGITAL DATA QUALITY ★ LOW NOISE ★ MADE IN USA
 ★ GUARANTEED

1 DOZEN C-10 LENGTH \$8.00 + \$2.00 shpg. 1 DOZEN C-30 LENGTH \$11.00 + \$2.00 shpg.
 2 DOZEN C-10 LENGTH \$15.00 + \$3.50 shpg. 2 DOZEN C-30 LENGTH \$20.00 + \$3.50 shpg.

Individual storage boxes (sold only with cassettes) \$2.40 per dozen.
CASSETTE CADDY \$5.49 + \$1.50 shpg./2 for \$10.00 + \$2.50 shpg./\$3.95 with cassette purchase (no shpg. chg. on caddy)
 Foreign orders include shipping at 16 oz. per dozen tapes/9 oz. per caddy/13 oz. per doz. boxes
 Shipments in U.S. are by UPS (no delivery to PO boxes) Add \$1.50 per doz. tapes for First Class Mail.

!!! NEW !!! CASSETTE CADDY !!! NEW !!!

TIRED OF MISPLACED TAPES AND A CLUTTERED WORK AREA? TRY OUR HINGED TOP SMOKED PLASTIC CADDY THAT HOLDS 12 TAPES IN ONE HANDY LOCATION



Visa and Mastercard accepted (include expiration date) Orders paid by cashiers' check, money order or bankcard are shipped within 48 hours. Personal check takes 1-2 wks. No COD. Some foreign sales are restricted. Texas residents add 5% tax on blank cassettes and storage units.

SEND ORDER TO: COLOR SOFTWARE SERVICES
 PO BOX 1723
 GREENVILLE, TEXAS 75401

★ DEALER INQUIRIES INVITED ★ QUANTITY DISCOUNTS AVAILABLE

*Note:
These are the
programs that
have received such
National Acclaim!!*

ExIBMer (NOW RETIRED)

For the FIRST TIME — Makes available to the PUBLIC
His personal collection of superior programs for the

TRS-80 COLOR

SEE HOW THE PROFESSIONALS DO IT!!

ALL PROGRAMS ARE OVER 14K LONG!!

TALKING GRAPHIC DEMONSTRATION

Like no other Computer Program that ever existed! Your CoCo will talk to you with a beautiful musical background and tell all about himself while displaying dozens of action packed hi-resolution graphic demonstrations. Programs RUN non-stop for 12 FANTASTIC minutes from 1 CLOAD.

"This demonstration is MANDATORY. You and your CoCo deserve this program."

Quote The Rainbow.

\$24.95T★



THE DISK DOCTOR — Cure that sick feeling and utter frustration caused by CRASHED I/O ERROR and UNREADABLE disks. Will SALVAGE M/L, BASIC, DATA, ASCII, even MPP Pictures. Menu driven for easy use. 100% visible operation lets you see what you are doing.
Automatic SALVAGE to NEW disk. All in OPEN BASIC!

\$49.95D★



MPP-TUTORIAL — Programming tool of the professionals — "lets you EASILY create superior graphics without using the tedious DRAW, PAINT, LINE, PSET, CIRCLE, etc. commands. I have seen the results, and they are INCREDIBLE — If you want to see and use the full graphic potential of your CoCo, this program is — REQUIRED!" Quote Chromasette.

\$34.95T or D★



EL CASINO — Three STARTLING action packed hi-res graphic games that have received RAVE reviews. All programmed with MPP. Each game is over 14K long.
All three games below.....

\$49.95T or D★



DICE GAME — The ONLY crap game that allows 4 players to make
12 Field Bets before every roll.....

\$24.95T or D★



BLACK JACK — Gives you the FAMOUS CARD COUNTER
sold for hundreds of dollars elsewhere.....

\$24.95T or D★



SLOT MACHINE — Looks like a \$30,000 Casino machine.
Sounds like one, too. Adjustable pay-off.....

\$24.95T or D★



★ T = 16K-EXTENDED

★ D = 32K-DOS

★ POSTAGE PAID

★ 704-452-4673

SUPERIOR GRAPHIC SOFTWARE

406 LITTLE MOUNTAIN ROAD — WAYNESVILLE, N. C. — 28786

Software Review...

THESE THREE WILL LET 80C "TALK"

Ever since we listened to HAL in 2001 - A Space Odyssey, we've been fascinated by talking computers. And your 80C can talk with the best of them, as evidenced by three unique programs available from Star-Kits and Spectral Associates (details below).

COMPUVOICE is a synthesizer that allows you to type in letter combinations called phonemes, which tell the 80C how to pronounce words. SOUNDSOURCE makes it possible for you to load sounds directly into memory and have them play back. You can also modify the sounds. NENTALK will "read" the contents of memory locations to you so that you can check the accuracy of machine language program listings. Star-Kits makes NENTALK, the two others are available from Spectral. All are in machine language.

The COMPUVOICE program allows you to program words into 80C using letter and symbol combinations. A list of them is supplied. For example, if you want to have the computer speak the word "eight" to you, you set up a string with the letter combination "AAYT." In all, there are 35 phonemes, ranging from a simple "B" to some complicated sounds such as the "NG" sound in "think." There are also stops and modifiers, in addition to the phonemes.

The sounds are set up as strings and can be executed as part of a BASIC program. This -- like all the other programs reviewed here -- is not tape recorded sound played through the speaker, it is actual computer-generated sound.

COMPUVOICE does take some getting-used-to. It requires you to think about words in terms of how they sound rather than how they are spelled. Once your mind makes this conversion (and there are some pages of documentation to help), the sound is a pretty fair approximation of human speech. The mating of the machine language program and a BASIC program which will use the sounds is easily accomplished and clearly explained.

SOUNDSOURCE will allow you to load any sound in from your tape recorder using a special (supplied) cable which runs from the recorder to the right joystick port. The program takes this sound, converts it to digital code, and then allows it to be played back. In addition, you can modify the sound with your joystick and you can also see a graphic representation of the sound on the

screen.

Like the other programs, this is not taped sound, but computer generated sound. I ran a test in with my voice and was amazed to hear it come back out from the 80C's memory. And, using one of the program's functions, I even played my voice back backwards -- since it is reduced to digital information, it is easy to do.

SOUNDSOURCE allows you to modify sounds and to save them as well. You can also shift them in memory, repeat them, and play them backwards. With all this capability, it is an excellent way to experiment with computer sound. You can create almost any noise you like.

It is especially interesting to see the sound waves on the screen. This will give you some ideas of what the sounds look like and how they might be changed to achieve the specific sound you want.

NENTALK solves a problem that plagues us all. It will "tell" you what is in a specific memory location. No more asking someone to help proofread your machine language listings, this one does it for you.

The "proofing" is done in hexadecimal. If you tell NENTALK to start at memory location 600 (hex) it will "say" "4C" or something to that effect. The voice is extremely clear and understandable.

Hitting a comma makes NENTALK say the memory address and the contents. Hitting a period gives you just the contents. Hit another comma (or period) and it moves to the next address.

If you are one of those people who needs someone to help you proofread machine language listings for accuracy, this is a perfect program for you. And, as with Star-Kits' HUMBUG program, the documentation is excellent.

COMPUVOICE, Spectral Associates, P.O. Box 99715, Tacoma, WA, 98499, \$44.95.

SOUNDSOURCE, Spectral Associates, \$24.95.

NENTALK, Star-Kits, P.O. Box 209, Mt. Kisco, NY, 10549, \$20.

LEM...Lunar Lander with new landscape each game!!
& PIRATE ADVENTURE....both for only
-\$8.00- (plus 50% postage & handling)

16K Ext. Cass.

Free Space Game

SUPERZAP!!

Century Software
1649 Geneva Ave. No.
St. Paul, MN 55119

80C PICKS THE NATIONAL FOOTBALL LEAGUE

16K
ECB

by John Waclo



It's time for NFL FOOTBALL! Is it really? Well if you're a football nut and you enjoy using your Color Computer, it's time to get ready for the 1982 NFL season.

Starting with this issue, I begin a three-part series on the NFL. Last year we spent the entire NFL season using our 80C to watch the teams. During the next three months we'll tell you what we learned and provide the program listings so you can try it yourself.

At one point last year we had three, 32K, 180C's analyzing data every single week. Even if you're not interested in the programming, you'll find the results fascinating. Why? Because we tried to predict the outcome of future games. The software even took into account the "point spread".

In Part I of this series we'll talk about what we learned from last season and we'll get your 80C into the NFL with a program listing that will generate a week-by-week schedule for the 1982 NFL games. In addition to being informative, the output from that program will be used to collect data for *The NFL Report* program.

Part II will present our program that generates *The NFL Report*, how to read it, how to enter data, and how it works. This report contains 32 pages of summarized team data, and is updated each week of the season. We've included the San Francisco 49er's team summary, from this report, for your review in this article.

Finally, Part III will discuss what we found as a result of closely watching each team's performance. From last year, we learned the NFL season plays like a chess game. It has an Opening, Mid-game, and End-game. Each has to be treated differently. See if you agree with our predictions and trends in Part III.

So much for an overview, let's get on with Part I.

The NFL season is 224 games, played by 28 teams in a time period of 16 weeks. It's all run by the National Football League, 410 Park Avenue, New York, (212)758-1500; nice

folks. This year's season starts on September 12 and we spin the team-wheel every weekend thereafter.

GIVE ME SOME OVERALL FACTS ABOUT LAST YEAR?

During last year's season we generated over 700 pages of printout while watching the progress of each team. Let's start with a little "cocktail knowledge" and some averages.

The next time you're at a party you can ask the question, "How many total points were scored in the entire '81 NFL season?". The correct answer is 9,282. When you have a computer plowing through home teams, away teams, point spreads, favorites, underdogs, and team power factors, you might as well have it calculate totals like this.

On the surface the total points scored in a given season appears totally useless, and it is. However, since we also know there are 224 games, and two teams in every game (in some games I have my doubts), the total points scored in an average, 1981, NFL game was 42; (21/team). Just think about that for a minute. That's a total of 6 touchdowns per game. It really looks like the recent rule changes have opened up the scoring.

WHAT WAS THE SCORE FOR AN "AVERAGE" NFL GAME?

The average score in 1981 was 27-14. Here's the important fact you need in order to calculate that number. The average point difference per game last year was 11.8. That really yields a game score of 27-15, but since 15 is hard to come by we made it 27-14.

DOES THE HOME TEAM REALLY WIN MORE OFTEN?

Yes it does. After keeping data on all the games played in 1981, we can say with accuracy that the home team won 62% of all games played. From this statistic it would appear the home team has a small, but definite, advantage.

DOES THE HOME TEAM HAVE AN ADVANTAGE WHEN YOU CONSIDER THE POINT SPREAD?

Yes, but it's very small. Again, for all games played last year, the home team won 54% of the time when you include the point spread. It looks like the people who establish the point spread are also aware of the home team winning percentage. Using the spread, they've done a good job of neutralizing the home team advantage.

For those readers who are not familiar with a point spread, or "line" as it's sometimes called, it's a small number of points assigned to one team, before the game, in an attempt to make the final score more even. When you include the point spread, you are talking a closer game.

You don't have to go to Las Vegas to find the point spread either. The NFL point spread is available in most major city newspapers under the syndicated column "The Latest Line". For the purpose of our data collection we used the "line" as published on Tuesday morning. The day after Monday Night Football.

WHEN YOU INCLUDE THE POINT SPREAD, HOW OFTEN DOES IT REVERSE THE OUTCOME OF THE GAME?

Not very often, or should I say just enough times to make things really interesting. Take your pick.

Actually, through the first 14 weeks of last season, the line only changed the winner in 21 games. That's an average of less than two games each weekend, or 10.7% of all games played.

Notice that I omitted the last two weeks of the season when I calculated the answer to this question. There's a valid reason for this. As the teams approached the playoffs, some games become meaningless because neither team had a chance for post season play. In most of these cases a line was not established. Since this would influence the statistic we're after, the last two weeks were dropped from our calculations.

HOW MANY TIMES DID THE POINT SPREAD MAKE THE GAME END IN A TIE?

For all 224 games played, only two ended in a tie when you include the spread. So the next time you're looking at a 3 point spread, and you're wondering if the other team will kick a field goal to end the game in a tie, you have the odds in your favor. It only happened in 0.9% of all games played last year. Of course that doesn't provide much consolation for the folks in the 0.9% category.

FOR MONDAY NIGHT FOOTBALL, DOES THE HOME TEAM HAVE A SIGNIFICANT ADVANTAGE?

(Continued on next page)

NOTHING FANCY — JUST GOOD SOFTWARE

DATE-O-BASE CALENDAR

Puts you in charge of your schedule. Graphically displays any monthly calendar between 1700 and 2099. You put in up to twelve 28 character memos per day - calendar shows where the memos are - call up of day shows details. Use for appointments and a log of past activity. Study the chronology of the American Revolution or note the day your mortgage will be paid off. Search capability allows you to list or print all memos between specified dates or only those meeting key word criteria. Date computation shows elapsed time between two dates in days, weeks, months, and years.

IN BASIC - REQUIRES 32K.

TAPE DATE-O-BASE CALENDAR - \$16.95
(max. 400 memos/tape file)

DISK DATE-O-BASE CALENDAR - \$19.95
(over 4,000 memos/disk - max 300 memos/month)



GRAPHIC SCREEN PRINT PROGRAM

For use with TRS-80* Line Printer VII and VIII. Ours is better because it works in all PMODES and lets you shift the screen image anywhere on the printed page. Load the relocatable code where you want it, lets you use all of your 32K machine. Now available for both Color Basic 1.0 and 1.1. Use EXEC41175 to see which you have and specify with order.

\$7.95 in Machine Language



HELP YOUR CHILDREN LEARN OVER THE SUMMER!

MATH TUTOR

Five programs that go from math fact (+, -, X, /) drill to full addition, subtraction, multiplication, and division at four levels of difficulty. Provides a step by step approach with error correction and rewards for good performance.

\$13.95 in BASIC



SPELLING TEACHER

Up to 200 of their spelling words stored on tape or disk are presented in four lively study modes including a scrambled word game.

\$12.95 in BASIC



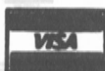
WE WANT YOUR SUGGESTIONS! Let us know what software you need. We don't promise to develop it, but if we do, you will be offered it at one half our retail price. No obligation on your part!

ALL PROGRAMS require Extended Color Basic and are delivered on cassette. All, except Tape Date-O-Base Calendar, are DISK System compatible.

TRS-80* is a trademark of Tandy Corp.)

Custom Software Engineering, Inc.

807 Minutemen Causeway
Cocoa Beach, Florida 32931
(305) 783-1083



For VISA and Master Card orders:
Include type, account number, expiration
date, signature and phone number.
Sorry! No COD's.

Add \$1.00 per order for shipping.
Florida residents add 5% sales tax.
Return within two weeks if not com-
pletely satisfied.

NFL (From Page 13)

Last year's numbers heavily favor the home team. I'm not sure if that's always the case, but the final results are interesting.

When you only consider Monday Night Football, the home team won 75% of all games. Said another way, the home team won 3 out of every 4 games played. Even when you include the point spread, the home team still won 62% of all the Monday night games.

Twice last season, the addition of the point spread reversed the winner of Monday Night Football. On both occasions the home team won the game, but the away team won when you included the spread.

Monday Night Football has become a real media event. Just look at its acceptance by the public and watch the enthusiasm of the home town fans. Apparently this does have a significant impact because the home team is winning more often. In any case, it's a number worth watching in the '82 season.

WHO WINS MORE OFTEN, FAVORITES OR UNDERDOGS?

The correct answer is both and neither. I'll explain myself after we

define these new terms.

We mentioned before, the point spread is some number of points given to one team, before the game begins, in an attempt to make the final outcome more even. The team which receives the points is called the *underdog*. The other team is called the *favorite*.

Don't draw the conclusion that the underdog is the poorer team just because it received points. It's intuitive to feel that way, but it's wrong. Many factors are involved in establishing which team will receive points, and which will not. Items like player injuries, home field weather conditions, and the won/lost record between the teams in previous meetings, all play a significant part in establishing the line for a given game.

Getting back to the main question, the answer comes in two parts. Through week 14 of the season (196 games), the underdog won 51% of all games, favorites won 43%, and the remainder were ties or "even" games with no line. Again, the last two weeks of the season were omitted because some team pairings were not given a line. These teams had no hope

Sugar
Software

introduces...

Silly Syntax

a sensational and educational version of a popular party game for the TRS-80 Color Computer...

For 1 to 10 players. Load a story into the computer. The players are asked to supply a noun, verb, part of body, celebrity, etc. which the program uses to complete the story. The story, which is displayed when all words are entered, will be hilarious. Silly Syntax requires Extended Basic. For \$19.95, you get a user guide and a tape containing the Silly Syntax game and 2 stories.

You can create your own stories or order story tapes from the selection below.

Silly Syntax stories - Ten stories per tape.

SS-001 -> Fairy Tales	SS-004 -> Current Events
SS-002 -> Sing Along	SS-006 -> Adventure/Sci-Fi
SS-003 -> X-rated	SS-007 -> Potpourri

Each story tape is \$9.95, 10% off for 3 or more story tapes.

Ohio residents add 5.5% sales tax.
Add \$1.00 per cassette for postage and handling.
Dealer inquiries invited.



Sugar Software
2153 Leah Lane
Reynoldsburg, Oh 43068
(614) 861-0565



®TRS-80 is a trademark of Tandy Corp.

Sugar
Software

introduces...

Auto Run

Auto Run is a utility program for the TRS-80 Extended Basic Color Computer. It is used to add convenience and professionalise to your software. Auto Run will create a tape which will consist of a machine language loader followed by your basic or machine language program. With this tape, a simple CLOADM command will load and start the loader which will then load and start your program.

You may design a title screen with the graphics editor which will display as your program loads. Also, you may record a vocal or musical introduction preceding your program. The Auto Run loader will control the audio on/off.

Basic programs can be set to load anywhere in memory above \$600 (the PCLEAR 0 page).

Software authors: The Auto Run prefix may be appended to your software products.

Auto Run is \$14.95 and includes complete documentation and an assembly source listing.

Ohioans add 5.5% sales tax.
Add \$1.00 per tape for postage and handling.
C.O.D. orders are welcome.
Dealer inquiries invited.

Sugar Software
2153 Leah Lane
Reynoldsburg, Oh 43068
(614) 861-0565

®TRS-80 is a trademark of Tandy Corp.



for a playoff possibility.

These statistics would seem to indicate that neither favorites nor underdogs have a real advantage. True, last year more underdogs won, but it's so close that it could change from year-to-year.

On the other hand, when you look at the season week-by-week, a different story begins to emerge. This story says both favorites and underdogs win during different parts of the season. I think this theory has credibility.

Basically, we know from looking at Monday Night Football performance, the home team appears to have a real advantage. It looks like the home team, and fans, play the same part during the beginning of the season.

After the first three weeks of last season, favorites had won 54% of the games; underdogs 38%. Clearly favorites seem to dominate the early part of the season. The next nine weeks (week 4 thru 12) saw the favorites only win 39% of all games played. The underdogs won more games for the rest of the season. It looks like the old saying, "Take the points and go with the underdog", might have some merit. Especially after week three.

DO HOME-TEAM-FAVORITIES WIN WITH A HIGH PERCENTAGE?

If you consider all of last season, they were a little less than even; 46% for the year. However home team favorites were dynamite at the beginning of the season. For the first three weeks of last year they won an excellent 60% of all games played. Even the few away-favorites did well during the early weeks, winning 75% of the time. However, away favorites finished with only an overall 42% win percentage.

HOW DO YOU CALCULATE THE RELATIVE POWER OF A TEAM?

If you're going to try to predict future game winners, you must have a way to give each team a power factor. One thing we learned from last season is don't get carried away with complicated analytical expressions. We tried different approaches, in parallel, using more than one 80C and the simple techniques seemed to work best. The equation we're using now takes into account each team's wins, total points scored, and the total points allowed.

USING YOUR APPROACH, WHICH TEAMS HAVE THE MOST POWER IN THE NFL?

There's no big surprise here. Our model confirmed reality. The big power teams today are:

-San Francisco	+20
-Cincinnati	+19
-Philadelphia	+19
-Dallas	+18

WHICH TEAMS HAVE THE LEAST POWER?

Just as our model confirmed the most powerful teams, it also did a good job at the other end of the scale.

-Cleveland	-1
-New England	-1
-New Orleans	-7
-Baltimore	-15

WHEN YOU INCLUDE THE SPREAD, WHICH TEAMS WERE THE BIG WINNERS AND LOSERS LAST YEAR?

Here are the top three and bottom three teams when you consider the spread:

-Cincinnati	12-4
-Miami	12-4
-San Francisco	12-4
-New Orleans	6-10
-Baltimore	4-12
-New England	3-13

By now you can see there are many ways to look at last year's NFL data for analysis. We could go on for quite awhile but that's not the entire purpose of this article.

If you think collecting information like this would be fun, and it would make every game in the NFL more interesting, then it's time to get your 80C into the NFL with our first program.

On April 8th the NFL released the 1982 National Football League schedule. I was under the impression these games were scheduled years in advance. They're not. In fact we had to work hard to get the schedule in this issue. Here it is! Only three weeks old, and already in RAINBOW.

If you load the listed program it will produce the schedule of games for any week you choose. The program is configured for an Epson MX-80 printer. However, it can be easily modified for most popular printers. Change line 110 for your Baud rate. You must also have at least 16K and Extended Basic to use this listing.

Run the program and it will ask

(Continued on next page)

NFL(From Page 15)

"which week's" schedule you desire. Enter your week of interest and the program will tell you to <ENTER> when the printer is ready. After that it will print the desired schedule.

IMPORTANT NOTE! At the pause... "hit <ENTER> when the printer is ready", if you enter the code "77 <ENTER>" the program will produce weekly schedules starting from the week you entered, to the end of the season. Therefore, if you want to see the entire '82 weekly schedule... enter "1" for the week of interest and the code "77" to finish the year.

The schedules which are generated clearly show the home and away teams for that week. On either side of the teams you'll see a capital "G" and "S". This stands for Game and Spread. If you want to try and guess winners for that week, just circle the appropriate "G" and "S" for the teams you think will win the Game and Spread.

The numbers at the top of the schedule indicate the number of games played to that week. There is a space to the left of each number for you to keep track of how many you've guessed correct. There are also numbers at the bottom of the schedule for you to total you're results for that week.

We'll talk more about the main program, *The NFL Report*, in the next issue (you'll need 32K to run it). It's the program that produced the team summary you see in this issue. Data that you collect on these schedule sheets will be used by the *Report* program so get this one running by next issue.

(NOTES: The baud rate is set in line 110. If you have a standard printer with a set baud rate, you should change this line to REN. Lines 420, 440 and 490 use CHR\$(14) to go to the double-wide characters. If you do not have an NX-80, your code may be different to go to doublewide. You may also have to turn off the doublewide characters in those lines, using your own printer controls. The NX-80 turns the doublewide characters off automatically with a linefeed.)

```
10 *****NFL SCHEDULES*****
20 'REV 4/19/82; (C) 1982,
30 'JOHN WACLO
40 'BOX 11224
50 'PITTSBURGH, PA 15238
60 CLS3:PRINT " ***NFL FOOTBALL
SCHEDULES***"
70 PRINTSTRING$(32,"=");:PRINT
80 INPUT"SCHEDULE FOR WHICH WEEK
";W:IF W<1 OR W>16THEN80
90 R2$=CHR$(10):R1$="":DIME$(28)
,G(448)
100 PRINT:PRINT"WHEN PRINTER IS
READY...":INPUT"PRESS <ENTER>";H
```

```
110 POKE150,18:POKE155,80
120 T$(1)="PITTSBURGH STEELERS"
130 T$(2)="CLEVELAND BROWNS"
140 T$(3)="HOUSTON OILERS"
150 T$(4)="CINCINNATI BENGALS"
160 T$(5)="BUFFALO BILLS"
170 T$(6)="MIAMI DOLPHINS"
180 T$(7)="NEW ENGLAND PATROITS"
190 T$(8)="NEW YORK JETS"
200 T$(9)="BALTIMORE COLTS"
210 T$(10)="SAN DIEGO CHARGERS"
220 T$(11)="OAKLAND RAIDERS"
230 T$(12)="KANSAS CITY CHIEFS"
240 T$(13)="DENVER BRONCOS"
250 T$(14)="SEATTLE SEAHAWKS"
260 T$(15)="DALLAS COWBOYS"
270 T$(16)="PHILADELPHIA EAGLES"
280 T$(17)="WASHINGTON REDSKINS"
290 T$(18)="ST. LOUIS CARDINALS"
300 T$(19)="NEW YORK GIANTS"
310 T$(20)="MINNESOTA VIKINGS"
320 T$(21)="DETROIT LIONS"
330 T$(22)="TAMPA BAY BUCCANEERS"
340 T$(23)="CHICAGO BEARS"
350 T$(24)="GREEN BAY PACKERS"
360 T$(25)="ATLANTA FALCONS"
370 T$(26)="LOS ANGELES RAMS"
380 T$(27)="SAN FRANCISCO 49ERS"
390 T$(28)="NEW ORLEANS SAINTS"
400 FOR Y=1TO448:READ G(Y):NEXT
410 FOR Y=((W-1)*28+1)TO((W-1)*2
8+28):CS=CS+G(Y):NEXT:IF CS<>406
THENPRINT"DATA ERROR IN WEEK";W:
END
420 PRINT#-2,R2$;R2$;R2$;PRINT#-
2,TAB(17)CHR$(14)"** GAMES FOR W
EEK ";W;"**";R2$;R2$
430 PRINT#-2,TAB(10)"GAME";TAB(3
6)"SPREAD";TAB(62)"MONEY";R2$
440 PRINT#-2,TAB(12)CHR$(14)"/";
14*(W-1);TAB(26)"/";14*(W-1);TAB
(39)"/";3*(W-1);R2$;R2$;R2$
450 PRINT#-2,TAB(18)"AWAY TEAMS"
;TAB(52)"HOME TEAMS";R2$
460 FOR Y=((W-1)*28+1)TO((W-1)*2
8+27)STEP 2
470 PRINT#-2,TAB(7)"G";TAB(12)"S
";TAB(17)T$(G(Y));TAB(38)" VS ";
TAB(44)T$(G(Y+1));TAB(67)"G";TAB
(72)"S";R2$
480 NEXT
490 PRINT#-2,R2$;R2$;PRINT#-2,TA
B(12)CHR$(14)"/";14*(W);TAB(26)"/
";14*(W);TAB(39)"/";3*(W);CHR$(
12)
500 IF H<>77THEN CS=0:GOTO60
510 IF W=16 THEN END ELSE W=W+1:
CS=0:GOTO410
520 DATA 25,19,23,21,2,14,3,4,12
,5,26,24,6,8,7,9,11,27,18,28,10,
13,22,20,17,16,1,15
```


530 DATA 20,5,9,6,4,1,15,18,21,2
6,28,23,8,7,11,25,16,2,10,12,27,
13,14,3,17,22,24,19
540 DATA 25,12,5,3,23,27,15,20,1
3,28,26,16,6,24,19,1,8,9,11,10,1
8,17,14,7,22,21,4,2
550 DATA 9,21,2,17,3,8,12,14,26,
18,6,4,20,23,7,5,28,11,19,15,16,
24,1,13,10,25,27,22
560 DATA 25,26,5,9,4,7,2,11,13,8
21,6,24,23,3,12,20,22,18,19,27,
28,14,10,17,15,16,1
570 DATA 25,21,9,2,23,18,4,19,15
16,13,3,12,10,26,27,7,6,28,20,1
1,14,1,17,22,24,5,8
580 DATA 2,1,15,4,21,5,24,20,6,9
28,26,8,12,11,13,18,7,10,14,27,
25,22,23,17,3,19,16
590 DATA 25,28,5,13,23,24,15,19,
3,2,26,10,6,11,7,8,16,18,1,4,27,
17,14,12,22,9,21,20
600 DATA 25,23,9,7,13,14,21,16,2
4,22,3,1,12,11,26,28,20,27,19,2,
8,5,18,15,17,4,10,6
610 DATA 5,7,23,22,4,3,2,6,15,27
13,12,24,21,20,17,28,10,19,26,8
1,11,9,14,18,16,25
620 DATA 9,8,4,16,21,23,12,28,26
25,6,5,20,24,7,2,1,3,27,18,14,1
3,22,15,17,19,10,11
630 DATA 2,15,19,21,9,5,23,20,13
10,24,8,3,7,12,26,28,27,11,4,16
17,1,14,18,25,6,22

640 DATA 27,26,25,13,5,24,4,9,15
17,3,19,12,1,20,6,7,23,18,16,10
2,14,11,22,28,8,21
650 DATA 16,19,10,27,9,20,23,14,
2,4,13,26,21,24,6,7,28,25,11,12,
1,5,22,8,17,18,15,3
660 DATA 26,11,8,6,25,27,5,22,24
9,3,16,12,13,20,21,7,14,28,15,1
9,17,1,2,18,23,4,10
670 DATA 9,10,23,26,2,3,13,11,21
22,24,25,7,1,19,18,8,20,16,15,2
7,12,14,4,17,28,5,6

Team Summary Next Page)

Software Review...

FLIGHT SIMULATOR NEEDSLOTS OF HELP

3-D RED BARON FLIGHT SIMULATOR doesn't really get off the ground as far as a quality program is concerned.

Sold by Seebree's Computing (456 Granite Ave., Monrovia, CA, 91016, \$16.95), this program does have some good graphics and, well, some potential.

But that is about all. You can get "up in the air" with it, although responses are somewhat sluggish. Once you are, you cannot "fly" anywhere, *per se*, instead, all of a sudden it is time to land.

Save your money.

HERE ARE 10 GOOD REASONS TO JOIN

- 1.) **FREE** programs. Good programs written by members are yours
- 2.) Subscription to the **RAINBOW** a magazine devoted entirely to the TRS-80 Color Computer
- 3.) Use of a library, with books programs & rompacks that you may check out and use for up to four weeks at a time.
- 4.) A club newsletter, with tips programs and data on CoCo.
- 5.) Buy, sell or trade with your ad in the newsletter **FREE**
- 6.) Discounts on many software & hardware items for CoCo. Save from 7 to 80 percent.
- 7.) The new member package, containing many helpful items.
- 8.) Discounts on subscriptions to CNN and chromasette mags.
- 9.) You may borrow parts for the Color Computer from the club and return them when you get the ones you ordered from RS this will save you down time
- 10.) You will have someone to ask about problems with software or hardware. Many members are master programmers, some are electronics experts.

The East Texas Color Computer Club
2101 E. Main St., Henderson, Tx. 75652

R. S. COLOR DISK SYSTEM SOFTWARE

DISK EDITOR/ASSEMBLER - This package includes a full featured disk based text editor program and a disk to disk/tape/memory assembler. The text editor is an easy to learn full featured editor which allows files larger than memory to be created and edited with ease. It is compatible with ASCII formatted tape & disk files to allow easy conversion of tape based programs. The assembler supports the full 6809 processor instruction set and will cross assemble 6800 code to 6809 object code. The output object file can be directed to either disk, tape or memory with overwrite protection. The object listing can be output to the screen or printer and versions for printers with or without line feeds are provided. **DISK EDITOR & ASSEMBLER \$79.95**

DISK TERMINAL PACKAGE - A disk based Terminal program for your color computer features full text buffering, baud rates from 300 to 9600 baud, programmable word length, parity bits odd/even/none, stop bits. The buffer size is automatically set to the maximum size of your memory. Full control codes can be sent, display word wrap is automatic. The text buffer can be saved or loaded from/to tape or disk. The contents of the buffer can be sent as a file with automatic re-entry to terminal mode, also a file can be sent directly from disk to another user. The contents of the buffer can be displayed on the screen or optionally be output to a printer plugged into the RS 232 port. All file formats are directly compatible with our text editor and word processor programs. **DISK TERMINAL PACKAGE \$49.95**

TEXTPRO I DISK TEXT EDITOR/WORD PROCESSOR - is a complete word processing system designed for easy learning and use. It features a disk based text editor for editing files larger than memory and direct processing of text files from disk or memory. Some of the editor commands include copy, move, search, replace, delete, line & automatic edit modes allow easy logical commands to add, change, insert, delete, skip up/down line, ignore changes made on last line, skip to begin/end of line all with easy single keystroke commands using arrow keys. The editor can also load, save and append tape or disk files for easy conversion of existing ASCII text files. The Word Processor includes over 29 commands for formatting the output, some of them include: page length, page mode on/off, page numbers on/off, left margin, top/bottom margin, line length, center, double width print, single, multiple & special indent, text lines left on page, skip to top of page, send control codes & ASCII data for special printer control, justify on/off, page heading, multiple footnotes per page, word fill mode on/off, send message to screen, display & input from keyboard and more. This is an excellent word processor with many advanced features and one of the easiest to learn and use in just minutes. All commands are logically oriented in easy to remember and associate 2 character commands. **DISK TEXTPRO I \$49.95**

TEXTPRO II TEXT EDITOR/WORD PROCESSOR - Includes all the features of TEXTPRO I plus 10 programmable tab stops, can be used with horizontal tab to next location, center over tab column, decimal alignment on tab column, right justify to tab column, tab to programed column. Also tab commands can use specific values for tab columns or programed values. Other additions include: character fill, right justify line, programmable footer can be centered/right justified/double width or almost any processor commands can be used with it, 3 programmable header lines, expanded footnotes and processable keyboard input data during word processing. **DISK TEXTPRO II \$79.95**

5566 Ricoshet Avenue
Las Vegas, Nevada 89110

CER-COMP
(702) 452-0632

All Orders Shipped From Stock
Add \$1.00 Postage - MC/VISA Add 3%

640 DATA 27,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1
 640 DATA 16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1

SAN FRANCISCO 49ERS

NFC WEST # 1

640 DATA 26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1
 640 DATA 15,14,13,12,11,10,9,8,7,6,5,4,3,2,1

NFL Ranking: 1

SPREAD Ranking: 1 T

640 DATA 25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1
 640 DATA 14,13,12,11,10,9,8,7,6,5,4,3,2,1

WON LOST

Records: 13 3
 12 4

At Home: 7 1
 7 1

FLIGHT SIMULATOR
 NEEDS HELP

Games played:

L W L W W W W W W L W W W W
 L W L W W W W W W L W W W L spr
 5U 2F 10U 6F 2U 5U OE OE 5U 2U 4F 3U 5F 7U 8F 7F

Last 3 games:

Offense is scoring 23 points/game

Defense is giving up 9 points/game

Average score difference is +15 points/game

Total Season:

Offense is scoring 22 points/game

Defense is giving up 16 points/game

Average score difference is +7 points/game

TEAM POWER FACTOR IS: +20

WON LOST

DETROIT LIONS

CHICAGO BEARS

ATLANTA FALCONS

NEW ORLEANS SAINTS

WASHINGTON REDSKINS

DALLAS COWBOYS

GREEN BAY PACKERS

LOS ANGELES RAMS

PITTSBURGH STEELERS

ATLANTA FALCONS

CLEVELAND BROWNS

LOS ANGELES RAMS

NEW YORK GIANTS

CINCINNATI BENGALS

HOUSTON OILERS

NEW ORLEANS SAINTS

640 DATA 28,27,26,25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1
 640 DATA 11,10,9,8,7,6,5,4,3,2,1

after week 16

640 DATA 25,24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1
 640 DATA 11,10,9,8,7,6,5,4,3,2,1

640 DATA 24,23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1
 640 DATA 10,9,8,7,6,5,4,3,2,1

640 DATA 23,22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1
 640 DATA 9,8,7,6,5,4,3,2,1

640 DATA 22,21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1
 640 DATA 8,7,6,5,4,3,2,1

640 DATA 21,20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1
 640 DATA 7,6,5,4,3,2,1

640 DATA 20,19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1
 640 DATA 6,5,4,3,2,1

640 DATA 19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1
 640 DATA 5,4,3,2,1

640 DATA 18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1
 640 DATA 4,3,2,1

640 DATA 17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1
 640 DATA 3,2,1

640 DATA 16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1
 640 DATA 2,1

640 DATA 15,14,13,12,11,10,9,8,7,6,5,4,3,2,1
 640 DATA 1,0

640 DATA 14,13,12,11,10,9,8,7,6,5,4,3,2,1
 640 DATA 0

640 DATA 13,12,11,10,9,8,7,6,5,4,3,2,1
 640 DATA 0

640 DATA 12,11,10,9,8,7,6,5,4,3,2,1
 640 DATA 0

640 DATA 11,10,9,8,7,6,5,4,3,2,1
 640 DATA 0

640 DATA 10,9,8,7,6,5,4,3,2,1
 640 DATA 0

640 DATA 9,8,7,6,5,4,3,2,1
 640 DATA 0

640 DATA 8,7,6,5,4,3,2,1
 640 DATA 0

640 DATA 7,6,5,4,3,2,1
 640 DATA 0

640 DATA 6,5,4,3,2,1
 640 DATA 0

640 DATA 5,4,3,2,1
 640 DATA 0

640 DATA 4,3,2,1
 640 DATA 0

640 DATA 3,2,1
 640 DATA 0

640 DATA 2,1
 640 DATA 0

640 DATA 1,0
 640 DATA 0

640 DATA 0
 640 DATA 0

640 DATA 0
 640 DATA 0

640 DATA 0
 640 DATA 0

640 DATA 0
 640 DATA 0

80-U.S.

THE TRS-80 USERS JOURNAL

If you own a TRS-80® Model I, Model II, Model III, the Color Computer, or the new Pocket Computer, YOU NEED 80-U.S.!

The 80-U.S. Journal has

programs for your enjoyment and enlightenment. Every issue contains several Basic or machine language program listings. It contains Business articles and program listings. No matter where you are, there is something for YOU in the Journal!

and...

The Journal contains reviews of hardware and software. Our "Evaluation Reports" will help you make the best choice in selecting additions to your system.

Save Over 50%

You can save over 50% off the cover price of 80-U.S. Journal. For the remarkably low price of **only \$16.00**, a savings of \$20.00 (cover price), you will receive a wealth of useful information every month. As a special **BONUS**, if you enclose payment with your order, you will receive an extra issue for each year of your subscription order. **Order three years of 80-U.S. and receive three extra issues! At no cost to you!**

Is your
TRS-80
Lonely?

Write today for
our
"No Risk Offer"

SEND TO:

80-U.S. Journal
3838 South Warner Street
Tacoma, Washington 98409
Phone (206) 475-2219

Name _____

Address _____

City _____ State _____ Zip _____

Visa/MC _____

Exp. Date _____

☐ 1 yr. \$16 ☐ 2 yrs. \$31 ☐ 3 yrs. \$45

Please allow 6 to 8 weeks for your first issue.

TRS-80 is a Registered Trademark of the Tandy Corp.

PRICKLY - PEAR SOFTWARE

QUALITY PROGRAMS FOR YOUR 16K EXTENDED COCO

Starfinder

This astronomical "star" computes the current sidereal time, and converts declination and right ascension to altitude and azimuth — or the other way around. Just enter your latitude and longitude, and the time of day. We include instructions to help you equip your dobsonian or tripod with setting circles. Quit wasting your time looking, and spend more time seeing. **\$19.95**



Household Helper

Actually five programs from one CLOAD, and you choose the one you want from the menu. You can do Metric conversions, adjust recipes to serve more or fewer people, figure gasoline costs, keep a data file of bills coming due, and you even get a stopwatch/timer. Full instructions. We probably should charge more! **\$14.95**



Mathpac I

Finally! A totally flexible, menu-driven set of elementary math programs for the color computer! **MATHPAC I**, developed and tested by an elementary teacher in his own classroom, allows the user to choose the operation (+-*/), difficulty level, number of problems, and a drill or testing format. This program employs sound educational principles, and even includes suggestions for classroom use. **\$19.95**



Football

A strategy version of America's game. The offense and defense enter their plays, and the results (different each time) are calculated and displayed on the scoreboard. Will they run up the middle or throw the bomb? Are they playing the prevent, or will they blitz? 36 different play combinations provide over 200 possible play outcomes, not counting the variables for yardage gained or lost. Intercept, fumble, blitz, punt, and kick field goals. Even an occasional long run or punt return for a touchdown! Be aware, this isn't another arcade wonder to see who's faster on the joystick, but all you sideline coaches are going to love it. **\$16.95**

Viking!

A simulation for 1 to 4 persons. Each begins as a landowner, and by farming their land, buying and selling land, expanding their fishing fleet, building on to their manufactory, increasing their population, equipping and training more soldiers, and regulating their taxes, each player tries to increase their economic power and rank until one becomes ruler over all. But beware plagues, rats, raiders, revolts, bad weather, and other misfortunes which may lie along the road to success. As you progress, see the map of your holdings increase. Playable in 1 to 2 hours, and different every time, you may have an addiction problem. **\$19.95**

NEW THIS MONTH

Fantasy Gamer's 32K Package

Similar to our popular Fantasy Gamer's Package, but both the Rooms and the Character & Monster Generator are in memory at the same time. You make your selection from a menu. In addition, you can select the **Dice Bag**, which will roll just about any probability you need. **\$24.95**

Ancient Wisdom Trilogy

Three programs, each drawing on the historical wisdom of the ages.

TAROT Ancient Egyptian deck of cards may reveal much. You can read past/present/future, circle of life, or ask a specific question. Lots of documentation. **\$17.95**

I CHING A Chinese wisdom so old its very origin is shrouded in the mists of time. The ancient Chinese oracle will give an answer to your question. What will the hexagram reveal? **\$16.95**

NUMEROLOGY What can be learned from the numbers? Do a character analysis, read your destiny, or chart your monthly cycles. **\$14.95**

All of these come with ample documentation — ready to be used immediately. **ALL THREE** for just **\$39.95**. Save \$9.90 over separate prices.

The Great Word Game

Perhaps the best word game ever for Coco. There's great graphics, music, and crisp formatting. Plenty of on-screen instructions. Two to four players compete. If you like Scrabble® and Probe® you'll love this one. **\$19.95**

Fantasy Gamer's Package

Two programs: The first will display your choice of 99 different rooms in Hi-Res graphics at the touch of a key. All standard sizes, plus some with pools, pillars, stairs, odd shapes, etc. Saves lots of game time spent describing room sizes, shapes, and door locations. Includes a super fast dungeon designing system and a completely keyed sample dungeon module — ready to play. The second program in the package generates **COMPLETE** characters including abilities, race, classes, hit points, age, thieving skills, much more, and also generates monsters. This package was developed by an active DM, and has been tested in his campaign. 20 pages of documentation. **\$19.95**

Notice:

It is our policy never to advertise an item unless it is already in our inventory, and ready to be shipped.

SEND A LONG S.A.S.E. FOR COMPLETE CATALOGUE

CASSETTE TAPE: Best quality Agfa tape in distinctive 5 screw shells. Stainless steel guide pins. C-12's - \$8.50 Doz. Add \$1.50 per dozen shipping.

Your Personal check is welcome - no delay. Include \$1.50 shipping for each program ordered. (Shipping free on \$50.00 or larger orders). Az. residents add 6% sales tax. Orders shipped within two days.

Send Order To: **PRICKLY-PEAR SOFTWARE**
3518 S. Randi Place
Tucson, Arizona 85730
(602) 886-1505

Probe® is Reg. T.M. of Parker Bros. Scrabble is Reg. T.M. of the Production & Mkt. Co.

Special Feature...

PRINTERS: AN OVERVIEW OF SOME FEATURES

By Lawrence C. Falk

Printers seem to be the most widely wished-for and, yet, most misunderstood thing you can attach to your 80C.

By far the most common subject of letters to the RAINBOW is the printer -- ranging from comments about a specific printer to questions (and questions and questions!) concerning how printers work, why they don't work and so on.

We're looking at this Special Feature to be a part of the RAINBOW on a fairly regular basis. Sometimes I'll write it (I'm into printers), and sometimes we'll let another person do the honors. We'll also ask for some cooperation from some of the printer manufacturers for some in-depth looks at the most common printers which can be attached to the 80C.

Judging from our correspondence, the most misunderstood thing about any printer is how to get all the goodies that the printer manual may specify you can use with a particular model. These frustrations seem to run the gamut from "special" character sets to dot matrix graphics. There is also a lot of confusion about how you "make" a printer do such-and-such. We'll try to clear up both of these things this month.

We've got to get a little technical to explain. First of all, there are, essentially, two kinds of printers -- intelligent and not-so-intelligent. The Line Printer VIII, the Epson MX-80, and the Microline 83A are examples of intelligent printers. The Line Printer VII is non-intelligent.

When we say a printer is intelligent, we mean that it has its own chips that translate signals and tell it what to do. It may, however, do some internal things with those chips as well -- such as count lines for a top of form (to roll the paper up to the top of a new sheet). Printers like the LP VIII and the MX-80 have a whole range of things they can do. A printer like the LP VII cannot do much more than print in regular and double-wide characters.

Oops. Before you take me to task on that one, I know that the LP VII

has dot-addressable capabilities. And, for the price, they make it one of the best printers on the market.

But LP VII is not really intelligent in the sense of some of the others which are available. For the purposes of this, however, all of that is beside the point (we'll talk about differences in printers in more detail another time).

What you have to know right now is that most of these printers -- from the smartest to the less-than-Einstein's -- all receive a signal from the computer telling them to print something. And, all this -- as is most everything the computer does -- is in the form of binary numbers. You know, those 1's and 0's that are a computer's "native" language.

There are only a limited number of ways to combine 1's and 0's. And, if you are using just seven of them, that limit comes after 127. Look on pages 184-187 of *Going Ahead...* and you will see that the binary number for 0 is the same in the last seven places as the binary number for 128.

With the 1.0 ROM in the 80C, the computer only sends seven bits to the printer. So, if you tell 80C to send a code to print a British pound-sign (decimal 193) to the printer (by typing PRINT #-2, CHR\$(193)), your printer will happily comply and print out an "A". But, an "A" is decimal 65, right? Right. Now look at the binary numbers. If you ignore the leading bit, the "A" and the Pound symbol are the same.

Since the 80C with the 1.0 ROM only sends seven bits, there is no eighth bit. That means the printer doesn't know which one you mean and, being confused, figures anything it does not see isn't there. That means it interprets the "nothing there" for a 0, and you get an "A".

Yes, the Pound symbol is "in" the printer, but the 80C isn't telling it to print it.

But you can, yes you can, solve this problem. Radio Shack has a program called an eight-bit driver which will add that eighth bit to the code the 80C sends to the printer. And, even better, it is free! Just ask for the PTFX program. (By the

(Continued on next page)

PRINTERS (From Page 21)

way, the Radio Shack SCREEN PRINT program has its own eight-bit driver.)

Once you load the eight-bit driver into the 80C (it is in machine language), you will send eight bits to the printer. Send a CHR\$(193) and, if you have a LP VIII, you'll get a Pound symbol.

Ah, but now...how do I get my MX-80 to print out dot graphics like the screen print routines I see in the RAINBOW?

The answer is that you don't. Not with the Radio Shack SCREEN PRINT program, anyway. Because, in addition to using the eight bits, the LP VII and LP VIII have different codes telling them to go into dot graphics than does, say, the MX-80.

The Radio Shack SCREEN PRINT program will work fine on a Radio Shack printer. But the commands are not the same for another printer and it won't work.

By way of illustration, try sitting down to an inferior computer -- such as, say, an Apple II -- and typing in some sort of command like LINE (28,32)-(133,77),PSET. Doesn't work, does it? That is because the LINE command isn't part of the Apple's BASIC vocabulary. And, the

instructions which tell the LP VII and LP VIII to print graphics are not part of the MX-80's vocabulary, either.

With an eight-bit driver, you can do dot addressable graphics with the MX-80. But, you will have to program it by hand (at least, until someone writes a program to do it for you).

By the by, the 1.1 ROM does put out eight bits, so you don't need a driver.

Finally, remember that both the LP VII and the LP VIII can be switch-selected to be eight or seven bit machines. You have to have the switch set to the proper place before you can send eight bits.

And, for that matter, both will receive either serial or parallel signals -- while the MX-80, off the shelf, is a parallel-only printer. The 80C sends serial signals to a printer.

With the MX-80 (and other printers that are "parallel only"), you can overcome the problem in two ways. One is to buy a special board from the printer manufacturer (many computer stores which carry 80C products can either stock or get these) or you can buy a converter that will change the serial signals from your 80C to parallel. Both the Microworks and Micro Labs carry these converters.

NEW!

**From GREAT X·P·T
for TRS 80 Color Computer**

**MISSILE
BARRAGE**



Color Sound
High Res. Graphics
Req. 16k Ext Basic
\$14.95 ea.

CRAPS
BOXCARS



GREAT X·P·T

**FOR THE
GAMBLER**
16k Ext Basic
High Res. Graphics
Play Alone
or Against
Your Friends
\$14.95 ea.

GREAT X·P·T

P.O. Box 9212
Livonia, Mi. 48150

Mich. Res. add 4% Sales Tax
C.O.D. add \$1.00

**SEA
BATTLE**



16k
Color
Sound
Graphics
\$14.95 ea.

GREAT X·P·T

FREE CATALOG AVAILABLE

SPECIAL BUY... ALL THREE FOR \$39.95

TRS 80 IS A T.M. OF THE TANDY CORP.

Software Review...

**FOOTBALL! USES
STRATEGY FOR PLAY**

There are two ways to play football (other than going out on a field, straining muscles and hurting yourself, of course). One of them is an arcade-style program with little figures running around and the other is to do some planning and thinking.

FOOTBALL! (Prickly-Pear Software, 3518 S. Randi Place, Tucson, AZ, 85730, \$16.95) is a strategy-type game. There are no graphics at all (but there is music). It is easy to play, keeps both sides interested and moves fast enough that there is plenty to do.

The program is a simulation that attempts to duplicate how a real play might come out if the circumstances were the same on the field. Obviously, there are some random considerations involved, but your chances of completing a long pass are considerably longer than your chances of completing a short pass. And, if the defense has a blitz on, there is always the opportunity for trouble if you are passing.

On the other hand, if there's a blitz going and your choice is a delay, things could work out very well.

Both the offense and defense have the opportunity to choose their plans before the play. This has the advantage of keeping both players busy. And, this isn't a "quick score" game, which means it is more like the real thing. However, when you do score, you get a song played (On, Wisconsin and the Notre Dame Fight Song). If you dislike thunder being shook down from the skies, you can change the songs.

Finally, the game can be played with a timer or be self-timed. Since there is no on-screen timer, its usually best to time it yourself. Otherwise, each half is about 18 minutes long, with no time-outs.

We enjoyed playing this one and think you will, too. And, in early summer it really whetted our taste for the upcoming season. Roll Tide!

Look for
the...



Software Review...

**SISI IS FUN FOR
KIDS, PARTIES**

SISI, the fortune-telling program, is a simple little game that will keep the kids amused and provide some fun at almost any party.

This program (Harmonycs, P.O. Box 1573, Salt Lake City, UT, 84110-1573, \$9.95) is pretty straightforward in that it doesn't do many fancy things, but it *does* work just fine and will keep everyone talking about your 80C.

It is based on that old fortune-telling game that most of us have seen -- where you ask the "magic ball" a question, turn it over, and get an answer. This program, however, has many more responses and provides a short test and art show to assist the fortune-telling process. And, the responses are more like those you get in Chinese fortune cookies.

Because the "art show" is in high-res graphics, you need a 16K extended 80C to run **SISI**.

**TRS-80[®] COLOR COMPUTER
SPECIALISTS****COLORFORTH**

FORTH is a high level computer language like BASIC or PASCAL. **COLORFORTH**, a version of **figFORTH**, is available NOW for the TRS-80C computer. **COLORFORTH** execution time is as much as 10 times faster than BASIC. **COLORFORTH** requires a minimum of 16K ram, but does not require either Extended Basic or disk system. When you purchase **COLORFORTH**, you receive both cassette and disk versions, the standard **figEDITOR**, and an extensive instruction manual.

ALL FOR ONLY..... \$49.95

Armadillo Int'l Software

P.O. BOX 7661 PHONE (512) 459-7325
AUSTIN, TEXAS 78712



COLOR COMPUTER DISK SYSTEM



We offer a complete disk drive interface system for the color computer, featuring the Tail Grass Technologies Double Density, buffered disk controller card. The disk interface board plugs into the color computer expansion socket and provides for doubling the storage capacity of single density type disk drives by using GCR encoding / decoding techniques. Power may be taken internally from the system or from an external power supply (not normally required even with piggyback 4116's installed). This controller will support up to 4 single/double density, single/double sided 5 & 1/4 inch disk drives. These include Shugart 400 series, Siemens 82, TEAC 50 series, Pertec FD200, MPI B51/52/91/92, Tandon and others. The controller uses standard 10 sector diskettes and does not read or write the soft-sectored IBM style formats used by TRS-80 or FLEX systems. Two reasons for not using a soft sectored system are cost and reliability.

The Tailgrass double density format offers more margin for worn diskettes, dirt etc. and less expensive single density disk drives & diskettes. All you need to add to have a complete disk system is a disk drive / cable.

DISK OPERATING SYSTEM (DOS)

The Disk Operating System for the Tailgrass Technologies Disk controller (CCMD+9) is a full featured "BASIC" compatible operating system. It is fully integrated with the ROM basic system already in the color computer and automatically is initialized upon system power on much the same as the R.S. disk system does. But there is a big difference between that disk system and CCMD+9. First of all we support any mix of 35, 40 or 80 track single or double sided disk drives, which allows a minimum of 4 times the storage capacity of the "other" disk system. We also make far better use of the disk storage space by using sector allocation for each file instead of the granular method of 8 sector blocks which can waste anywhere from 1 to 7 sectors for each file on the disk. For example, on their DOS, if 5 files each required only 2 sectors there would be 40 disk sectors allocated, a waste of 30 disk sectors or almost 4 "granuals". This is not the case in our disk system, only the required number of sectors would be used.

Many other disk systems using a sector allocation system have a problem with file fragmentation and excessive seek time after a disk is used over and over adding and deleting files until it becomes so bad that the disk must be re-formatted to correct the problem. With CCMD+9 this is not the case, as files are deleted the disk space is automatically repacked to help keep files from being fragmented and decrease access time.

The DOS is contained in a ROM on the disk controller the same as the R.S. disk system so you don't have to "bootstrap" the DOS off of a disk and it doesn't get clobbered easily by a runaway program as most ram based systems do. The DOS does "NOT" require Extended Basic and will run on a 4, 16 or 32K system without any modifications. CCMD+9 uses approximately 1K of ram for the disk system which is taken from the top of memory, this allows all previously purchased tape software to function with the disk system, this is not so with the R.S. disk system.

CCMD+9 supports both Basic and Machine language programs. It is easily accessible to the beginner or advanced machine language programmer with easy to use and well documented entry points to perform disk as well as screen/printer/keyboard input & output. It includes 10 disk file functions to open, close, read/write random or sequential files, read specific sector of file, flush sector buffer to file, close & rewind file (re-open) and process disk system errors. The screen/printer/keyboard I/O functions include: input character, output character, output text string, output carriage return, output 2/4 hex characters, output space character and read/write single disk sector.

The "BASIC" interface system allows Basic and Basic programs to communicate with the disk system much the same as the R.S. disk system does with a few added features. It includes both Direct and Indirect basic commands. Direct commands can be executed any time and indirect commands are contained within "Basic" programs. The Direct commands include: LOAD or SAVE (binary/ASCII basic program disk file), CHAIN (load & execute basic program) and CDOS "disk command". The "CDOS" command allows you to execute a specific disk command from the free standing disk system, these include: LOAD/SAVE machine language or memory file, REMOVE one or more disk files, CHANGE disk file name, CHECK disk file for errors, ANALYZE disk directory, STRACK set tracks & sides for disk drive, SCMP set compare on/off, RUN load & execute machine language disk program. GOTO execute machine language program at specified address, and NEW initialize disk. If the "CDOS" command is executed without any command following control is passed to CCMD+9 where any of the previously mentioned commands can be executed directly

CO RESIDENT EDITOR/ASSEMBLER



Co-resident Editor/Assembler that will allow the user to create, edit and assemble machine language programs for the color computer. The editor portion of the program is similar to the text editor in TEXTPRO. The assembler will output machine object code to either cassette tape in a "CLOADM" readable format or directly to memory for direct execution. The assembly listing can optionally be output to the printer connected to the RS-232C/Printer port on the color computer. All errors are displayed with a full text message for easy identification. The assembler supports the full compliment of the M6809 instruction set and also will cross assemble 6800 source code to produce M6809 compatible object code.

CO-RES9

\$39.95

SYSTEM MONITOR



TRSMON is a 2K system monitor program that will allow you to explore the workings of the color computer. It features 9 debugging commands, tape load and save compatible with Basic "CLOADM", up/down load via RS232 port, terminal package that allows the color computer to be used as a terminal at baud rates up to 9600 baud and a printer driver to direct display output to the printer for memory dumps, disassemblies etc. The program is position independent so it can be moved anywhere within the system memory. A very powerful tool at a very reasonable price. Commands include:

Memory examine & change, Goto defined address, Load Tape program (w/offset), Load Motorola S1-S9 file (RS232), Save Tape program, Send memory file S1-S9 (RS232), Set and/or display breakpoints, Remove one or all breakpoints, Define printer/terminal baud rate, Set and/or display registers, Dump memory in Hex & ASCII format, Disassemble memory file, Terminal mode & optional buffer, Fill memory, Move block of memory, Find memory byte sequence, Exit monitor to Basic, Exit monitor to Rom Pack (\$C000), Re-initialize monitor, Direct output to printer.

TRSMON ON TAPE

\$19.95

TRSMON on 2716 Epm

\$34.95

8K COLOR RAM/EPROM CARTRIDGE HOLDS 4-2716 EPROM or RAM
2K RAM CHIPS \$19.95
5 1/4" DISKETTES, SOFT OR HARD SECTOR, BOX OF 10
MOTOROLA 6809 PROGRAMMERS MANUAL
+ \$2.50 SHIPPING 1ST CLASS

\$24.95

2716 EPROMS \$14.00

\$30.00

\$11.95

thus providing total control of the entire system. The command system is easy to learn and remember with a minimum of effort on the users part. The BASIC interface system was designed to be compatible with the existing I/O commands used with tape files for easy conversion and upgrading to disk. When using Basic disk files up to 9 files can be active at once with all disk file memory allocation being done automatically at run time, you don't have to reserve file space as with the R.S. disk system. The indirect basic commands include: Open, Print, Input, Line Input (ext. Basic), EOF, Rewind, Close, Print Using (Ext. Basic), these all function in the same manner as basic tape file I/O.

CCMD+9 has one other unique feature not found in most disk systems. Each disk initialized by the system is assigned a disk label which can be used instead of a disk drive number, the system will automatically locate which drive the diskette is on and use it accordingly. This can be very useful in basic programs which use files on multiple disks, you don't have to worry which disk belongs in which drive.

Part of the power and flexibility of CCMD+9 lies in the Disk Utility System which allows the system commands to be greatly expanded by adding utility or transient disk commands. These commands are automatically handled by the system so as not to overwrite Basic programs in memory and can even be called by a Basic program in some cases. For example you can perform a disk copy or backup while still preserving a basic program currently in memory, no other system that we know of has this ability. We currently have a list of utilities available and will be adding to it constantly to improve the system.

SOFTWARE SUPPORT

This disk system is the most recent one to enter the color computer disk market and is currently the only one with any disk software to support it. There should be no problem in the future with a lack of software for this system because, it is extremely easy to interface software to. We currently have available for the disk system: a Disk Assembler which allows files larger than memory to be assembled, a Disk Text Editor which makes writing Basic and Assembler programs easy and also will edit files larger than memory, a Disk Text Editor/Processor (WORD PROCESSOR) TEXTPRO1 which is easy to learn and extremely powerful for its price range, TEXTPRO II is an advanced version with expanded features: programmable tabs, 3 line processable headers, decimal/center/right justify/ horizontal tabs, keyboard input processing and more. A Disk Disassembler/Source generator, a Disk system monitor which includes all of the "TRSMON" monitor commands & has access to all of CCMD+9 disk commands & automatically locates itself at the top of memory to stay out of the way, and a full compliment of disk utilities. The utility disk includes: full disk backup, build disk text file from keyboard, 24 hour screen clock, single or multiple disk file copy, text file executive processor, ASCII/HEX file dump/list/map utility, ASCII file lister/printer, and a disk relabel utility. All at prices far below what other disk system software sells for.

CG-99 Disk Controller w/CCMD+9 DOS ROM	\$159.95
CCASMD9 Disk Assembler	\$ 34.95
CCEDT9 Disk Text Editor	\$ 24.95
CCDIS9 Disk Disassembler Source Generator	\$ 29.95
CCTPR1 Disk Text Editor/Word Processor TEXTPRO 1	\$ 39.95
CCTPR2 Disk Text Editor/Word Processor TEXTPRO 2	\$ 59.95
CCUTLY Disk Utilities	\$ 19.95
DOSMON Disk system monitor/utility program	\$ 29.95
CGAME1 HI-RES Graphic games Space Invaders, Meteoroids, Space War	\$ 49.95
CGAME2 Mixed games Battle Fleet, Space Traders, Adventure	\$ 39.95

SPECIAL LIMITED OFFER

We have a complete disk system package available that includes: a 40 track single sided disk drive with power supply, case, 2 drive cable, TG-99 controller w/CCMD+9 and a disk containing CCUTLY disk utilities and CCEDT9 disk editor all assembled and tested for \$499.00
Additional 40 track drive with power supply & case tested \$300.00

For double sided drives add \$100.00 per drive. Add \$5.00 per drive for shipping, NO COD's on disk drives or disk system special. Shipping for disk controller add \$2.50, for disk software only add \$1.00. Visa & M/C add 3% (this is what the bank charges us).

Manufactured under license from Tail Grass Technologies.

TEXTPRO TEXT EDITOR/PROCESSOR



TEXTPRO is a complete text editor & text processing program for the Color Computer. The program includes our powerful full function text editor plus the added features of a text processor. The entire program utilizes only 6K of memory space including the tape, screen and keyboard buffers. It is extremely fast in editing and processing text files and is compatible with Basic ASCII formatted tape files.

The Editor itself includes 24 commands including string search & replace; line and automatic line edit modes which allow you to insert, delete, change or add characters. Automatic line editing allows you to skip forward and backward for checking and editing, all screen editing immediately updates the screen so you know exactly what you are doing at all times. The Editor also has commands to move or copy single lines or blocks of text from one place to another. Some of the other commands include Tape load, save and append; Automatic line numbers, delete line, set input line length and printer output.

The Text Processor includes 29 commands for formatting the output, some of them include: page length, left margin, top & bottom margin, line length, justify & fill modes, page heading, center line, double width print, margin control, single, multiple & special indent modes, test lines left on page, display & input from keyboard and even special control codes can be sent to the printer for different print densities etc. It even has a repeat command with a next command to redo all of or a portion of the file as many times as needed. TEXTPRO will turn your color computer into a full fledged text processing machine at a price you won't believe. Available on "CLOADM" compatible cassette.

SPECIAL INTRODUCTORY PRICE \$29.95

RS. DISK VERSION \$49.99

DATAPACK DATA COMMUNICATIONS PACKAGE

DATAPACK is a Terminal package program for the COLOR COMPUTER, allowing you to use the color computer as a buffered computer terminal through a modem to a time sharing network or as a direct connect terminal to another computer system at rates up to 9600 baud. This program is more than a standard "Videotext" type program in that it will allow you to save data stored in the buffer either to cassette tape, or output a hard copy to a printer. The data buffer is automatically set to the maximum size of your system memory when entered to allow maximum space for saving data. The program includes features to send control codes and to enable or disable keyboard echo. When the terminal mode is exited the contents of the buffer may be viewed on the screen or saved to tape for later loading. Also the RS-232 port can be used to print your printer back in for sending the screen buffer to the printer. An additional feature is the ASCII format that is used on tape is compatible with the CER-COMP Text Editor program and BASIC, enabling you to edit or delete unwanted information.

PRICE: \$24.95 ON CASSETTE

RS. DISK VERSION \$49.95

5566 Ricochet Avenue
Las Vegas, Nevada 89110

CER-COMP
(702) 452-0632

All Orders Shipped From Stock
Add \$1.00 Postage - MC/Visa Add 3%

Game...

ICE LANDER CAN BE A SLICK RUN

Ted Shorter writes us from Cuyahoga Falls, Ohio, to say that he is 13 years old "and a computer freak."

We're not certain what the definition of a "computer freak" is, but if it means a promising young programmer, then Ted fills the bill.

16K
ECB



He explains this game, the listing of which follows, this way:

"I'd been using SET and PSET to move dots around the screen when I decided to try my hand with GET and PUT to move objects instead. It would look better to have actual space ships moving around than dots.

"After a long period of trial and error I got an idea for a lunar lander type of game.

"It took me an afternoon to write the basic loop, but it took me about a week to get everything down just right.

"So here it is. I was surprised at how long it was. I couldn't believe I did all that!

"Here is a description of the lines in the program:

1	-	4 Credits
10		Dimension arrays
30	-	60 Menu
70	-	400 Main loop
410	-	810 Various subroutines
10000	-	High score subroutine

Note: This game uses a POKE 65495,0 to speed up the game. If your computer can't handle it, then delete lines 460, 630 and 710 and edit line 200 to read GOSUB470.

This game also features a high score subroutine that requires joysticks so you can put your name in. Just for interest, my high score is 1610.

```

1 'ICE LANDER
2 'BY TED SHORTER 1981
3 '2578 SYLVAN RD.
4 'CUYAHOGA FALLS, OHIO, 44221
10 DIM L(2),B(2),K(18):G=.1:HN$="
  NOBODY":HS=10
20 CLS:YM=0
30 PRINT"1 START GAME":PRINT"2 G
  ET INSTRUCTIONS":PRINT"3 CHANGE
  GRAVITY LEVEL"
40 PRINT0265,"WHICH ONE?"

```

```

50 FOR Z=1 TO 2000:Y$=INKEY$:IF
  Y$="1" THEN 70ELSE IF Y$="2" THE
  N 770 ELSE IF Y$="3" THEN 410
60 NEXT:PRINT"WELL?":GOTO 50
70 CLS:POKE 65494,0:INPUT"OXYGEN
  LEVEL":0
80 IF 0>200 THEN PRINT"YOU'LL BE
  SORRY!!":0=51
90 00=0
100 PMODE 4,1
110 PCLS
120 DRAW"BM128,96D4U2R4D2U4L4"
125 PAINT(129,97),5,5
130 FOR Z=1 TO 25:X=RND(18):X=X+
  100
140 Y=RND(18):PSET (X,Y,5):NEXT
150 GET(100,0)-(118,18),K,G
160 GET (128,96)-(132,100),L,G
170 GET (0,0)-(4,4),B,G
180 PCLS
190 SCREEN 1,1
200 GOSUB 460
210 X=9:Y=9:XM=3
220 Y$=INKEY$
230 PUT(X-2,Y-2)-(X+2,Y+2),B,PSE
  T
240 IF Y$="^" THEN YM=YM-1
250 IF Y$=CHR$(10) THEN YM=YM+1
260 IF Y$=CHR$(9) THEN XM=XM+1
270 IF Y$=CHR$(8) THEN XM=XM-1
280 X=X+XM:Y=Y+YM
290 YM=YM+G
300 IF Y<9 THEN Y=9
310 IF X<9 THEN X=9
320 IF Y>189 THEN Y=189
330 IF X>244 THEN X=244
340 0=0-1:IF 0=50 THEN PLAY"L32C
  CC" ELSE IF 0<0 THEN 680
350 IF PPOINT(X,Y+3)=5 AND PPOIN
  T (X+4,Y+3)=5 AND XM=0 AND YM<2
  THEN 580
360 IF PPOINT(X+4,Y+3)=5 AND PPO
  INT(X,Y+3)<>5 THEN PUT(X-6,Y-5)-
  (X+12,Y+13),K,PSET:GOTO 680
370 IF PPOINT(X,Y+3)=5 AND PPOIN
  T(X+4,Y+3)<>5 THEN PUT(X-12,Y-5)
  -(X+5,Y+13),K,PSET:GOTO 680
380 IF PPOINT(X,Y)=5 OR PPOINT (
  X+4,Y)=5 THEN 680
390 PUT(X-2,Y-2)-(X+2,Y+2),L,PSE
  T
400 GOTO 220
410 CLS:PRINT"          CHOOSE:"
420 PRINT"1 NO GRAVITY(EASY)":PR
  INT"2 LITTLE GRAVITY(FAIRLY EASY
  )":PRINT"3 EARTH GRAVITY(HARD)":
  PRINT"4 JUPITER GRAVITY(VERY HAR
  D)"
430 PRINT"          WHICH?"
440 G$=INKEY$:IF G$="1" THEN G=0
  ELSE IF G$="2" THEN G=.1 ELSE I
  F G$="3" THEN G=.5 ELSE IF G$="4
  " THEN G=.7

```

(Continued on next page)

ICE(From Page 25)

```

450 IF G$="" THEN 440 ELSE 20
460 POKE 65495,0
470 LINE-(0,100),PSET:PCLS
480 FOR X=10 TO 120 STEP 10
490 Y=RND(160):Y=Y+20
500 LINE-(X,Y),PSET
510 NEXT
520 LINE-(X+5,Y),PSET
530 FOR X=130 TO 250 STEP 10
540 Y=RND(160):Y=Y+20
550 LINE-(X,Y),PSET
560 NEXT:Y=RND(160):Y=Y+20:LINE-
(255,Y),PSET:PAINT(10,180),5,5
570 RETURN
580 PUT(X-2,Y-2)-(X+2,Y+2),L,PSE
T
590 POKE 65494,0
600 FOR Z=1 TO 4
610 PLAY"L16CG04C03"
620 NEXT
630 POKE 65495,0
635 S$=STR$(FIX(Y+4)*10+O*VAL(G$
)-00)
640 CLS:PRINT"YOUR SCORE="+S$
645 S=VAL(S$)
650 PRINT"AMOUNT OF OXYGEN LEFT=
";O
660 FOR Z=1 TO 460*16:NEXT

```

```

665 GOSUB 10000
670 GOTO 20
680 PUT(X-9,Y-9)-(X+9,Y+9),K,PSE
T
690 POKE 65494,0
700 PLAY"L4FFL8FL4FG+L8GL4GL8FL4
FL8EL2F"
710 POKE 65495,0
715 GOSUB 10290
720 GOTO 20
730 CLS:PRINT" ICE LANDER
"
740 PRINT:PRINT"EVERY TIME YOU H
IT AN ARROW, YOU GO FASTER IN THA
T DIRECTION.....BUT GRAVITY PLAY
S A PART, TOO." :PRINT:PRINT"OXYGE
N STARTS AT WHAT YOU SET, UNLES
S YOU ENTER MORE THAN 200. THEN
IT LEAKS AND YOU ONLY HAVE 50."
750 PRINT"HIT [ENTER]."
760 IF INKEY$=CHR$(13) THEN GOTO
20 ELSE 760
770 CLS:PRINT" ICE LANDER
"
780 PRINT" YOU MUST PILOT A SHIP
OVER THE FROZEN PLANET GARBONZO
."

```

Own a TRS-80 Color Computer? Wish you had Lower Case?

For \$75.00 and five minutes of your time you can have full upper and true lowercase (not just reverse video) with the LCA-47 lowercase adapter from Micro Technical Products.

What is it?

The LCA-47 is a small PC board (1.9 x 3.6 in.) that plugs into your computer's main PC board; leaves the expansion connector free. It doesn't take up any system memory; uses a fast Bipolar Character Generator for guaranteed operation. Installation is quick and simple: no cutting or soldering required.

Fully assembled, tested, and guaranteed for 1 full year.

Two switches provided on board: one to enable or disable the lowercase. The other to invert the entire screen (light characters on a dark background).

What does it provide?

The 128 characters below: improved upper case and very readable lowercase with descending tails, all available to both Basic and machine language programs.

```

! " # $ % & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ?
! " # $ % & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ?
@ a b c d e f g h i j k l m n o p q r s t u v w x y z [ \ ] ^ _
@ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [ \ ] ^ _

```

Custom character sets are available as an option, call for a quote.

Compatibility: The LCA-47 is fully compatible with all TRS-80C software that we know of, including Color Scriptorit. It has no effect on any semi-graphics or full-graphics modes. Also works great with Micro-Chroma-68 Kits and others using the 6847 VDG chip! The LCA-47 will not fit under the RF shield if Computerware's "16-plus" memory board is installed.

How to order: Send \$75.00 plus \$5.00 shipping in the U.S., \$10.00 elsewhere, to:

Micro Technical Products, Inc.

814 W. Keating Ave., Dept. A
Mesa, AZ 85202

Arizona residents add \$3.75 sales tax.

Phone: 602-839-8902
MC and VISA welcome.




```

781 PRINT "WEIRD SHAPES OF DEADLY
    ICE FORM."
782 PRINT "USE THE ARROW KEYS FOR
    CONTROL."
783 PRINT "WHEN YOU ARE ASKED FOR
    AMOUNT OF OXYGEN, REMEMBER THAT
    175 IS A NORMAL AMOUNT."
784 PRINT "A WARNING BUZZER TELLS
    YOU WHEN YOUR OXYGEN IS LOW."
790 PRINT "YOU MUST LAND ON A FLA
    T SURFACE."
800 PRINT "HIT [ENTER]"
810 IF INKEY$=CHR$(13) THEN GOTO
    730 ELSE 810
10000 IF S<HS THEN 10290 ELSE CL
    S:PRINT "GREAT SCORE!!!!!"
10010 PRINT "YOUR SCORE BEAT THE
    FORMER HIGH SCORE. YOU SHOULD BE
    PROUD OF YOURSELF!!!!!!"
10020 PRINT:PRINT "ENTER YOUR NAM
    E IN. MOVE THE JOYSTICK BACK&
    FORTH TILL YOU GET THE RIGHT LETT
    ER. THEN PRESS THE BUTTON WHEN TH
    E LETTER IS RIGHT.";
10025 HS=S:N$=""
10030 PRINT:PRINT
10040 PRINT " ";:RESTORE:FOR PL=1
    TO 26
10050 READ LP$:PRINTLP$;
10060 NEXT
10070 DATA A,B,C,D,E,F,G,H,I,J,K
    ,L,M,N,O,P,Q,R,S,T,U,V,W,X,Y,Z
10080 PRINT "O"
10090 PRINT@384+28,"V"
10100 PRINT@416+28,"E"
10110 PRINT@448+28,"R"
10120 PRINT@321,"";
10130 X=JOYSTK(0)
10140 W=X/2.25
10150 W=INT(W)
10160 IF W=27 THEN W=28
10170 IF W=0 THEN W=1
10180 PRINT@320+W,"V";
10190 FOR Z=1 TO 10:NEXT:PRINT@3
    20+W," ";
10200 P=PEEK(65280)
10210 IF P=254 OR P=126 THEN L=W
    ELSE 10130
10220 IF L=28 THEN 10290
10230 RESTORE:FOR LL=1 TO L
10240 READ L$:NEXT
10250 N$=N$+L$:HN$=N$
10260 IF LEN(N$)=4 THEN 10290
10270 PRINT@416+11,N$;
10280 GOTO 10130
10290 CLS:PRINT "TOP SCORE IS"HS"
    BY "HN$
10300 FOR Z=1 TO 460*12:NEXT
10310 RETURN

```

Software Review...

**DISK DOCTOR A
GOOD PRESCRIPTION**

Twice the night before mailing the RAINBOW and all through the place

Arose a wailing because on the mail list disk of addresses there was not a trace...

We apologize for the bad poetry (we hope none of you will review it), but it does serve to point out that even the best handling and the most vital of information can crash on a disk. And when it does (and when your two backups do, too), my friends, there's trouble in River City.

We were able to go through the mailing records on hard copy by hand when that happened back in December. It did take about 15 hours, and there were not nearly as many subscribers then. And, while a disk is a wonderful thing, when it goes wrong it goes wrong. Just points up the fact that even the 80C isn't immune to Murphy's Law.

What we needed, desperately, was the DISK DOCTOR.

Too late to have helped us through that particular travail of toil, but not too late if it ever happens again comes a marvelous utility program from Superior Graphic Software (406 Little Mountain Road, Waynesville, NC, 28786, \$49.95) that will salvage your crashed disks quickly and easily. It will even restore files that you might have KILLED by mistake.

DISK DOCTOR simply allows you to examine a disk track by track, sector by sector, and salvage the files there. No matter if the directory track is destroyed. No concern if the file allocation table is garbage. No worry whether you are dealing with BASIC programs, machine language programs or data files. This one will save them all to a new disk and, of course, write a new directory and file allocation table in the process.

There are no instructions with DISK DOCTOR. Normally, this would bring about automatic disapproval from this reviewer. But it does not because this program comes, instead, with a crashed disk and a step-by-step guide on how to salvage it. Once you've gone through the process, you don't need instructions. It's a good learning tool.

We are very enthusiastic about DISK DOCTOR. It lets you zip

(Continued on next page)

from sector to sector, track to track, backwards and forwards quickly and easily. It displays what is on a specific disk track, and it also gives you a large graphic blank space if there is nothing there. When you salvage tracks, they write on the screen in graphics, so you know how much space you are filling up. Then, quick as a wink, you simply transfer the salvaged material to a new disk.

Finally, as a bonus, one of the programs on the crashed disk Superior supplies is a nice utility -- a machine language program packer which removes all the extra spaces in a BASIC program. All you have to do is salvage it off the crashed disk and it is yours.

DISK DOCTOR requires 32K and, of course, at least one disk drive. And if you have one, you ought to have **DISK DOCTOR**.

RAINBOW SEAL TO HELP CONSUMERS

The RAINBOW is pleased to announce implementation of the RAINBOW SEAL OF CERTIFICATION.

The Seal is a service of the RAINBOW and is available to any vendor who is selling items for use with the TRS-80 Color Computer. The RAINBOW makes no charge whatsoever for use of the Seal by vendors.

Use of the Seal, however (shown on the right) is allowed only under very specific guidelines. In order to secure use of the Seal for a product, a vendor must have a copy of a product on file with the RAINBOW.

Our guidelines are very specific. In terms of programs, a vendor is not allowed to display the RAINBOW Seal for any version of a program which is not on file and commercially available. In other words, in order for a Seal to be available for both a cassette and disk version of a program, both the cassette and disk versions must be on file with the RAINBOW.

Vendors are allowed to display the Seal in their advertising when notified by the RAINBOW. Any instances of a Seal being improperly displayed will receive prominent display in this magazine.

The RAINBOW Seal program has been devised by us in an effort to protect you, the consumer. We hope you will look for the Seal in any advertisements you see and act accordingly. Vendors awarded the Seal are not limited to using it with the advertisements in the RAINBOW.

We also believe the Seal will



TRS-80* COLOR COMPUTER*

- 16K Extended Basic, Menu-Driven, Well-Documented, Easily-Modified.
- For either cassette or diskette systems (Be sure to specify).
- Place an order of at least \$40 and get one extra of your choice free.
- Orders shipped on cassette - Add \$5 for shipment on diskette.

-FURST-

Date Element Dictionary driven File Update and Retrieval SysTem. Create and maintain files according to your specifications. Ideas for applications included.\$25

-MAILING LABELS-

Generate and maintain mailing label records. Selectively print desired quantities. Can keep several label files if desired. Designed for Printer VII, easily modified. \$20

-DISK DIRECTORY PRINT-

For diskette users only. Get hard copy of disk directories on your printer for easy use and reference. Only \$5

Send check or money order to:



LAND SYSTEMS

P.O. Box 232
Bellbrook, Ohio 45305



*TRS-80 and COLOR COMPUTER
are Trademarks of Tandy Corp.

protect the overwhelming number of honest vendors who produce the quality products you expect to receive when you send them money. We hope you will use the Seal as a guide when making a purchase.

Awarding of the Seal carries no warranty of any kind from the RAINBOW. It simply means we have received a product and that the product does, indeed, exist. The Seal is not an attempt to evaluate a product. We hope you will continue to look to our reviews to do that.

We hope you will find the Seal useful and helpful.

Finally, we ask you to note that implementation of the Seal will take some time. Because of that, please do not draw any conclusions from lack of a Seal on any advertising in this issue of the RAINBOW (or any other publication in the next several weeks or months). Deadlines of all publications are such that it sometimes takes a little time to change advertising copy.

SUBMITTING MATERIAL TO RAINBOW

Contributions to the RAINBOW are welcome from everyone. We like to run a variety of programs which would be useful/fun/helpful to other 80C owners.

Program submissions should be on tape or disc. We're sorry, but we do not have the time to key in programs. All programs should be supported by some editorial commentary, explaining the program and how it works. We're more interested in how it works than how you developed it. Programs should be learning experiences.

If you wish, editorial material can be written with any of the word processors currently available for the 80C, or for Scripsit 2.0 running TRSDOS 2.0a for the Model II. Typed (or printed out) copy double spaced is fine, however. Please do not imbed control codes for any particular printer.

We do pay for substantive submissions, based on a number of criteria. Those wishing remuneration should so state when making submissions.

Please do not submit programs or articles currently submitted to another publication.

BACK ISSUE AVAILABILITY

Back copies of ALL issues of the RAINBOW are again available.

All back issues sell for the single issue cover price -- which is \$2 for copies of numbers 1-8 and \$2.50 for copies of numbers greater than 8. In addition, there is a \$3.50 per order charge for postage and handling. This charge applies whether you order one back issue or all of them.

Most back issues are available on white paper in a reprint form. All back issues now available would be \$23.50, plus \$3.50 postage and handling -- a total of \$27. VISA and MasterCard accepted. Kentucky residents add 5% sales tax.

Due to heavy demand, we suggest you order the back issues you want now.

SEPTEMBER

OF

KZIRGLA

RAINBOW CONNECTION SOFTWARE presents...



*Reviewed in the RAINBOW
At last...a real-time graphics adventure game with arcade sound for your Color Computer! If you are bored with silent screens of text but enjoy the challenge and complexity of adventure games then SEPTEMBER OF KZIRGLA is for you. 16K Ext \$16.95 cass - \$21.95 disk
ALSO ANNOUNCING...

\$26.95 each cassette - 2 New MULTIPAKS - \$31.95 each menu-driven disk
Combo #1 - following 4 Twinpaks:
\$11.95 Brickout/Wordguess
\$11.95 B-17 Bomber/Metric Magic
\$11.95 Blackjack/Math Tutor
\$11.95 Compund/Jackpot

Includes \$2.00 shipping.
Minno residents add 5% tax.
Dealer inquiries invited.



Combo #2 - following 4 Twinpaks:
\$11.95 Starfighter-4/Tic-Tac-Toe
\$11.95 Biorhythms/Hinefield
\$11.95 Computation/Chuck-A-Luck
\$11.95 Lunar Lander/Math Drill

RAINBOW CONNECTION SOFTWARE
3514 6th Place N.W.
Rochester, MN 55901

Not affiliated with THE RAINBOW. \$2.00 per item discount to all subscribers.

ACTION GAMES

The fastest growing producer of computer games for your 6809 has the products you have waited for!!

NEW!
**CAVE
HUNTER**

**ARCADE GAMES FOR
THE COLOR COMPUTER**

**COLOR
BERSERK**

Fast paced action • Super Hi-Res Graphics
Dynamite sound effects • Runs in 16K of memory

These games will astonish you with their Detail and Quality.
They set a standard for others to follow.



— ADVENTURES —



Calixto Island • The Black Sanctum

Highly acclaimed by reviewers • Challenging situations
Fast, efficient machine language • Runs in 16K of memory
Save game in progress



Adventures on 5¼ TSC FLEX disc (specify 6800 or 6809)	ea. \$24.95
Both adventures on single disc	\$39.95
Adventures for color computer	ea. \$19.95
Color Berserk for color computer	ea. \$24.95
Cave Hunter for color computer	ea. \$24.95

Shipped prepaid in continental U.S. California residents, please add 6% tax.



— MORE COMING SOON —



MARK DATA PRODUCTS

23802 Barquilla, Mission Viejo, CA 92691 • (714) 768-1551

TRS 801S A TRADEMARK OF TANDY CORP.

MAKING SPECTACULATOR STRUT ITS STUFF

By Dick White

Who hasn't at least thought about writing a checkbook balancing program or thought of buying one early on in their computer experience?

There are certainly 20,000 or more checkbook programs in existence than there need to be and I may be guessing low. Of course, I have made my contribution to the debris and I don't feel at all bad about making another, since it is a good example to use to show how SPECTACULATOR operates.

To fully use it you need to understand how it works. The book that comes with the program does a good job of describing the basic command structure and giving some examples.

But, once you add complexities, problems can crop up. In many cases there seem to be solutions, but ingenuity and a non-conventional way of looking at things may be required.

SPECTACULATOR is not all that VisiCalc is, but it still is quite a powerful program. For example, it took me a good 40 to 50 hours to write and debug my checkbook program in BASIC. It took me an hour to program SPECTACULATOR to do the same job.

In addition, SPECTACULATOR will print out the results while my program won't. At the outset, here are some things to keep in mind:

1. SPECTACULATOR calculates all column functions before it does any row Functions.
2. It calculates columns from left to right and rows from top down.
3. In any cell, a row function has priority over a column function.
4. When using commands involving individual rows and columns, there must be an entry in each row or column cited (the entry can be a 0) for the calculation to be made.
5. When using SUM, there must be a number in the start row or column for the calculation to be made. There do not need to be entries in rows or columns between the start and the total.
6. Column functions apply to all rows in that column except those where row functions are assigned. Row functions apply to all columns in that row.

One way to get a good handle on these rules is to work through a simple demonstration. Before calculating, our spreadsheet look like this:

	1	2	3	4
1				C2+C3
2		2		
3		3	0	
4		4	0	
5	SUMR2			
6	R5			
7		5	0	
8		6	0	
9		7	0	
10	SUNR6			
11	R12			
12	R10			

The functions involved have been entered as text in Row 1 and Column 1. Note that there is no "0" in Cell 2,3. After calculating, the sheet looks like this:

	1	2	3	4
1				C2+C3
2		2		
3		3	0	3.00
4		4	0	4.00
5	SUMR2	9.00		
6	R5	9.00		
7		5	0	5.00
8		6	0	6.00
9		7	0	7.00
10	SUNR6	27.00		
11	R12			
12	R10	27.00		

Column 2 has been totalled in Row 5 but Columns 3 and 4 have not due to the absence of an entry in start Cell 2,3. The missing entry prevents calculation of the column function across Row 2.

Everything works in Column 2 except moving the Row 12 total to Row 11. Since the program moves down the column, there was no value in Row 12 when the Row 11 calculation occurred.

It is difficult to demonstrate the priority of row functions in a cell over column functions. If we had a Column 5 with a column function C2, Column 5 would look just like Column 2. This is not because everything in Column 2 was copied into Column 5. Only the entries would have been copied with the totals being supplied by the row functions. A second calculation will produce this sheet:

(Continued on next page)

SPECTACULATOR (From Page 31)

1	2	3	4
			C2+C3
1			
2	2		
3	3	0	3.00
4	4	0	4.00
5	SUMR2	9.00	
6	R5	9.00	
7		5	0 5.00
8		6	0 6.00
9		7	0 7.00
10	SUNR6	27.00	
11	R12	27.00	
12	R10	27.00	

Cell 11,2 has been filled in with the value that was in Cell 12,2 before the calculation. To prove this to yourself, simply change one of the entered values in Column 2. Cell 11,2 will be 27.00, but Cell 12,2 will be something else. Finally, put a "0" in Cell 2,3 and calculate. Rows 3 and four fill out except for Row 11.

1	2	3	4
			C2+C3
1			
2	2	0	2.00
3	3	0	3.00
4	4	0	4.00
5	SUMR2	9.00 0.00	9.00
6	R5	9.00 0.00	9.00
7		5 0	5.00
8		6 0	6.00
9		7 0	7.00
10	SUNR6	27.00 0.00	27.00
11	R12	27.00	
12	R10	27.00 0.00	27.00

Now let's set up the checkbook "program" in SPECTACULATOR. Figures 1 and 2 are printouts from SPECTACULATOR of a fictitious run. I used Row 1 and Column 1 to show the column and row numbers. Column functions are shown in Row 2 and the row function in the date column. Set the following column widths:

1,7 2,5 3,4 4,7 5,7
6,12 7,16 8,16

Columns 9 and 10 are essentially a scratch pad and will set their own width as required. Set the following column and row functions:

Col 5-C10 Col 9-C5-C4

Col 10- SMT C9

Row 98- SUMR5

In Row 3, enter the text headings shown in Figure 1. Finally, enter a "0" in each row of Column 5 from Row 5 to Row 97. You should now save your program to tape so you can have a fresh spreadsheet in the future rather than having to clean up a used one.

To use your checkbook, enter dates and check numbers (or other transaction identification) in Columns 2 and 3 using the ET mode. Check values and other charges are entered (EN mode) as debits in Column 4. Deposits and other monies into the account are entered as credits in Column 5.

When you enter a credit, YOU MUST enter a "0" in the debit column. If we had filled out Column 4 with zeros, the program would have wasted time calculating down to Row 98 each time. This way the presentation is cleaner and faster. Just don't forget to fill Column 4 when you put deposits in Column 5. Payee and purpose go into Columns 7 and 8 at your option.

You will need to perform two calculations. On the first, SPECTACULATOR will fill in Columns 9 and 10. Since it works left to right, it will make no new entries under balance in Column 6. It does this on the second calculation.

It is quickest if you enter all your updates and then run the calculations. Save your working spreadsheet to tape (twice for safety) and run it back in when needed. When you get to the bottom, save it for reference and load the fresh sheet you made at first. Note that on a fresh sheet, the starting balance goes under Credits on Row 4 and "0" must be entered in Column 4 of that row.



"AND TO THINK, I THOUGHT THE NICEST TOUCH IN THE WORLD WAS MY FLOATING POINT 9-DIGIT ACCURACY. I THINK I'M IN LOVE!!"

1	2	3	4	5	6	7	8
					C10		
3	DATE	TRNS	DEBIT	CREDIT	BALANCE	PAYEE	PURPOSE
4	BALANCE		0	665.14	665.14		
5	4/5	4117	18.70	0	646.44		
6		DEP	0	415.16	1061.60		
7	4/12	4118	15.89	0	1045.71		
8		4119	7.80	0	1037.91		
9		4120	752	0	285.91	INTERNAL REV SVC	INCOME TAX DUE
10		4121	61	0	224.91	DEPT OF TAXATION	STATE INC TAX
11		4122	12.99	0	211.92	CITY TAX DEPT	CITY INC TAX
12				0			
97				0			
98	SUMR5		868.38	415.16	4514.40		

Figure 1

9	10
C5-C4	SMT C9
665.14	665.14
-18.70	646.44
415.16	1061.60
-15.89	1045.71
-7.80	1037.91
-752.00	285.91
-61.00	224.91
-12.99	211.92

Figure 2 -453.22 4514.40



RAMCHARGER 32K UPGRADE

Space Invaders

Space War

- The Best Games Available
- High Resolution Graphics
- Fast, Machine Language
- Ext. Basic Not Required
- \$21.95 each, cassette
- \$25.95 each, disk

EXTENDED BASIC GAMES

- LOTHAR'S LABYRINTH)
Word Search Puzzle
- BATTLEFLEET
Battleship Search Game (one or
two players)
- SPACE TRADERS
Galactic trading game

\$14.95/ea.

COMPUVOICE

Give your computer a voice of its own - build speech into your BASIC programs. This machine language program is a must for your library - no hardware modification needed.



\$44.95

- EXTEND MEMORY
FROM 16K to 32K
- 100% Compatible With
Extended Basic
- No Soldering Or Modification
Fits Inside Computer
- \$79.95

THE FACTS

At last, a complete description of the "guts" of the Color Computer. Specs on all the ICs, complete schematics, theory of operation and programming examples.

\$14.95



TRS-80

MADNESS & THE MINOTAUR

The best adventure game available for the color computer. Over 200 rooms, 6 creatures, 8 magic spells, loads of treasures. Written in machine language, extended Basic not required.



\$19.95

NEW EXTENDED BASIC GAMES!

- SUB HUNT \$14.95
- LASER ATTACK \$10.95
- ALCATRAZ II \$8.95
- Complete with high resolution graphics and sound.
- CROID \$12.95
- Eliza type artificial intelligence game.

SOUNDSOURCE

Store music or voice from a cassette tape in the computer and display it on the TV screen. Shorten it, lengthen it, modify it and replay it through the TV's sound system. Build and test your own sounds for games. No hardware mods needed.



\$24.95

UTILITIES

- EDITOR/ASSEMBLER \$34.95
- SUPER MONITOR 19.95
- EPROM PROGRAMMER 89.95
(Program your own ROMs for the ROM-PAC port)
- MAGIC BOX 24.95
Load MOD I/III Tapes into the color computer
- TYPING TUTOR 19.95
- TEXT EDITOR

DEALER INQUIRIES INVITED



SPECTRAL ASSOCIATES

P.O. BOX 99715
Tacoma, Washington 98499

WRITE FOR COMPLETE CATALOG
ADD 3% FOR SHIPPING \$1.00 minimum

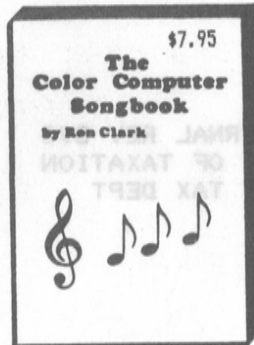
Allow 2-3 wks. for delivery

(206) 565-8483

VISA OR MASTERCARD ACCEPTED

Color Computer

40 of the world's best-known songs, scored for easy playing on the TRS-80 Color Computer, including favorite popular, classical, folk and seasonal music selections.



The Color Computer Songbook

Color Computer

The must-have handbook, loaded with tips, tricks, secrets, short-cuts, hints and scores of complete ready-to-run graphics programs.



Color Computer Graphics

Color Computer

The must-have software Ideabook, overflowing with hints, secrets, shortcuts, and color techniques ...with 101 ready-to-run programs.

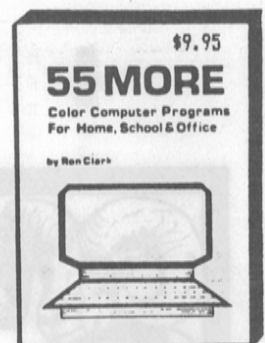


101 Color Computer Programming Tips & Tricks

Color Computer



An all-new and different collection of tested, ready-to-run software for businessmen, teachers, students and hobbyists.



55 MORE Color Computer Programs for the Home, School & Office

Order direct from this ad. Send check or money order. Include \$1 shipping for each item ordered up to a maximum of \$3. Or write for our free catalog. Mail orders to:



SPECTRUM PROJECTS

COMPUTERS
VIDEO

93-15 86th DRIVE
WOODHAVEN, N.Y. 11421

(212) 441-2807 (VOICE)
(212) 441-3755 (DATA)

CHECK OUT OUR "COLOR" BBS AT (212) 441-375524 HOURS EVERY DAY
New York State residents add appropriate taxes

Tired of plugging and unplugging devices from the RS232 port of your Color Computer? Make your life easier. Buy our RS232 expansion cable and connect two devices at the same time. Just right for printers, modems, etc. Anything that plugs into the Color Computer will plug into this high quality cable.

RS232 Cable \$20.00

COLORCOM/E BONUS! Order COLORCOM/E and get the RS232 cable for only \$15.00. Save \$5.00!

RS232 EXPANSION CABLE



16K Chips	-- \$ 29.95/set	NEW ! Extended Basic ROM Kit	-- \$ 85.00
Verbatim Diskettes	-- \$ 24.95/10	RS Disk Interface	-- \$149.95
T-120 Video Tapes	-- \$119.00/10	Lowerkit	-- \$ 79.95



COLORCOM/E

SMART TERMINAL PACKAGE



WE DIDN'T WAIT for the competition to catch up with us! We've added even MORE features to COLORCOM/E, our superb Smart Terminal program for the Color Computer. Compare before you buy. NOBODY offers you more!

- COMPLETE UPLOAD AND DOWNLOAD SUPPORT
- AUTOMATIC CAPTURE OF FILES
- ONLINE CASSETTE READS AND WRITES
- SEND ALL 127 ASCII CHARACTERS FROM KEYBOARD
- 110, 300, 600 OR 1200 BAUD
- 7 OR 8 DATA BITS (INCLUDING GRAPHICS SUPPORT)
- FULL OR HALF DUPLEX
- WORD MODE ELIMINATES SPLIT WORDS
- PRE-ENTER DATA BEFORE CALLING (SAVES \$\$)
- EFFICIENT DATA STORAGE STRETCHES YOUR MEMORY
- OFFLINE AND ONLINE SCROLLING
- CONVENIENT PLUG-IN CARTRIDGE

COLORCOM/E \$49.95 (Plus \$1 S/H)

AND our efficient storage and easy editing of received data makes printing to your printer offline a snap. Select any portion of the received data for printing, no need to print everything.



COMPUTERS
VIDEO

SPECTRUM PROJECTS

93-15 86th DRIVE
WOODHAVEN, N.Y. 11421

(212) 441-2807 (VOICE)
(212) 441-3755 (DATA)

New York State residents add appropriate taxes

4019-142-526-293
4/83

PIPELINE

Having trouble converting machine language tapes to run on that new disk drive? Tom Mix Software has a new program in the works called *THE FIXER* which, we hear, will do that little chore with ease. We also understand there are some other utilities in the works that will make the backing up of disks to tape -- and tape to disks -- almost automatically.

One of the most widely-desired business type programs we hear about is something that will handle mailing lists. Computerware announces a new mail list program, as well as a new graphics arcade game called *STARSHIP CHANELEON* and a checkbook manager program. All are said to be available now.

One of the things that is not available yet, but, we hear, is in the final stages, is a nothing-like-it arcade game from Mark Data Products (*DRESEK* and others). Look for a review shortly.

The inside dope from Ft. Worth is that the Radio Shack's editor/assembler should be available very shortly now. Not so for their new *Investment Analysis* package,

which isn't due until September 1.

Radio Shack has announced a four-pin RS-232 cable that is five feet long and will connect the 80C to its Network III.

And speaking of Radio Shack, they've arranged to make American Airlines flight information available on Videotex in the Dallas area for flights into and out of the Dallas-Ft. Worth regional airport. That's DFW for you flying buffs.

Platinum Software says it has a new program which will allow full screen editing of BASIC programs, gives automatic line numbering and allows single key entries of more than 90 BASIC words. It comes with a plastic overlay. There will be a review.

There are two contests going in this month's edition of the *RAINBOW*. One is detailed in the FRP Column by Bill Nolen. There are details about the other in the editor's column, *PRINT #2*.

Except for the month of December, when things are really bad due to the Christmas mail rush, you should expect your copy of the *RAINBOW*

absolutely no later than the 25th of any month. We're going to try to advance that a bit, but that's a safe cutoff point. If you have not received your current month's issue by the 25th, please write us a postcard. We'll rush a replacement issue to you.

Do you spell as poorly as we do? If so, there is an answer in the wings -- a spelling checker from Star-Kits. We hear that the program will be available in both tape and disk versions and will have a dictionary of some 20,000 words. That would be a big bonus in word processing software. Expect a review next month.

Quite a number of books are beginning to appear on the 80C. We've either seen announcements or news releases on several of them. They'll be reviewed as received.

In our review of the *GSPR* program available from Custom Software Engineering, we mentioned that the program worked well but that it did not have a driver routine which could be used with the 1.0 ROM. Now, Custom has a second version of this program which includes an eight-bit driver so that 1.0 ROM users can use this program without having to load a separate driver.

TOM MIX SOFTWARE

3424 COLLEGE N.E.
GRAND RAPIDS, MI 49505
PHONE (616) 364-4791

NEW*NEW



WAR KINGS \$19.95

REMEMBER WARLORDS? YOU'LL LOVE THIS ONE. A CHALLENGING GAME FOR TWO FOR YOUR COLOR COMPUTER. HIGH RESOLUTION GRAPHICS WITH OUTSTANDING SOUND MAKE THIS A REAL TREAT. MACHINE LANGUAGE(16K EXT. BASIC)



MOON LANDER \$15.95

THIS ONES A REAL WINNER. TWO PROGRAMS FOR THE PRICE OF ONE. TRAIN ON MOON LANDER AND THEN MOVE UP TO LANDER II. REVIEWERS SAY JUST LIKE FLYING. OUTSTANDING GRAPHICS AND SOUND. VISIT THE MOON WITH YOUR COLOR COMPUTER. MOST REALISTIC ON THE MARKET TODAY. (16K EXT. BASIC)



DANCING DEVIL \$14.95

HERES A DEMON OF A DEAL. WATCH HIM DANCE TO PREPROGRAMMED ROUTINES OR PROGRAM YOUR OWN MUSIC AND DANCE STEPS. YOUNGSTERS AND ADULTS ALIKE LOVE HIM. RAVE REVIEWS BY COLOR COMPUTER MAGAZINES. MACHINE LANGUAGE(16K)



ML RABBIT \$14.95

NO SERIOUS PROGRAMMER CAN AFFORD TO PASS THIS UP! MAKE COPIES OF ANY MACHINE LANGUAGE OR BASIC PROGRAM EFFORTLESSLY. EVEN COPIES PROGRAMS THAT AUTOMATICALLY EXECUTE. COMPLETELY AUTOMATIC. PROTECT YOUR TAPES WITH ML RABBIT. (CAUTION-INTENDED TO MAKE BACK UP COPIES ONLY)



EDUCATIONAL \$19.95 each

MATH DRILL- DESIGNED TO TEACH ADDITION, SUBTRACTION, MULTIPLICATION, AND DIVISION TO THE STUDENT OF ANY AGE.

SPELLING TEST- HEAR YOUR CC TALK TO YOU. AN OUTSTANDING LEARNING TOOL. STUDENTS LOVE TO LEARN WITH THIS PROGRAM. FOR ANY AGE.

WORD DRILL- COMPLETE PACKAGE DESIGNED BY A TEACHER AS A VOCABULARY TEACHING AID.

DISK LIST \$19.95

ALL NEW DISK LISTING PROGRAM. LIST THE CONTENTS OF YOUR DISK TO PRINTER. EVEN PRINTS THE ADDRESSES OF MACHINE LANGUAGE PROGRAMS.

NEW*NEW

● ADD \$1.00 POSTAGE & HANDLING ●

MICHIGAN RESIDENTS ADD 4% SALES TAX

VISA

MasterCard

● TOP ROYALTIES PAID ●

LOOKING FOR NEW SOFTWARE



SPELL 'N FIX

Finally Available for the Color Computer!

Now produce goof-proof text on your Color Computer by letting SPELL 'N FIX find and correct your spelling and typing mistakes. Used since 1981 on larger 6800 and 6809 systems, SPELL 'N FIX is now available for your Color Computer too.

- ★ Checks your text against a 20,000 word dictionary and finds your spelling and typing errors.
- ★ Displays all questionable words, or prints them on your printer for later action.
- ★ Even corrects errors in your text. Wrong words can be highlighted or changed to their correct spelling.
- ★ Fast and accurate — reads text faster than you can, spots and corrects errors even experienced proofreaders miss.
- ★ Dictionary can be expanded and customized — technical and even foreign words are easily added.
- ★ Available for the Radio Shack disc, cassette, or Flex disk operating system.
- ★ Compatible with all Color Computer Text Processors, including TeleWriter!

SPELL 'N FIX is available off-the-shelf right NOW, and costs \$69.29 in the Radio Shack disk or cassette versions (32K RAM required!); \$89.29 in the Flex version. (Other versions, including Percom DOS, SSB DOS, and OS-9 versions also available — contact us.)



HUMBUG

Now in a Color Computer Version

HUMBUG is the famous SUPER MONITOR for 6800 and 6809 systems — you can now use it on your Color Computer too.

HUMBUG is a complete machine language monitor and debugging system which allows access to the full power of the 6809E processor in the computer. HUMBUG lets you

- ★ Input programs and data into memory.
- ★ Output and list memory contents in various formats.
- ★ Insert multiple breakpoints into programs.
- ★ Single-step through machine language programs.
- ★ Test, checksum, and compare memory contents.
- ★ Find data in memory.
- ★ Start and stop programs.
- ★ Upload and download from bigger systems, save to tape.
- ★ Connect the Color Computer to a terminal, printer, or remote computer.
- ★ Learn how the Color Computer works by studying the listing of HUMBUG in the complete manual.

HUMBUG is available right NOW on disk or cassette for \$39.95 for 16K or 32K Color Computers. Special version for 64K systems costs \$59.29 and is compatible with software for large 6809 systems.

Other Color Computer Software

CHECK 'N TAX — Basic programs for checkbook maintenance and income tax reports, for either RS Disk or Flex, \$50.

REMOTERM — allows full operation of the Color Computer from an external terminal. \$19.95.

LFPRINT — permits the Color Computer to be used with non-standard serial printers which do not support handshaking or automatic line feeds. \$19.95.

NEWTALK — a memory examine utility for machine language programmers which reads out memory contents through the TV set speaker. \$20.

SHRINK — our version of Eliza, in machine language and extremely fast. \$15.

OXXO — our version of Othello, also machine language and very fast. \$15.

We accept cash, check, COD, Visa, or Master Card. NY State residents please add appropriate sales tax.

Star Kits

P.O. Box 209—R
Mt. Kisco, N.Y. 10549
(914) 241-0287

NOW A WHOLE BAG OF DICE

By Bill Nolen
RAINBOW Columnist

Well, here it is, April already. Yes, I know you're reading this in June, but I'm writing it in April. For those of you who don't live in Arizona, don't worry, I'm not going to talk about the weather.

I am going to talk about how you can replace your \$5 set of dice with a \$600 computer, not counting the TV. The program below will replace your dice, and automatically compute just about any range of probabilities needed in an FRP game.

After you type in the program and run it, a border will be drawn around your screen, and a menu of 36 different choices will be presented to you. You just key in your choice -- no need to hit enter -- and the results will be displayed at the bottom of the screen.

All results are figured "correctly," so that the odds of any given number popping up are the same as if you had actually rolled the proper number of dice.

If you want to simulate the roll of two six-sided dice, giving a spread of 2-12, you have to total two RND(6) statements. Of course, you can get a spread of 2-12 in other ways, like RND(11)+1, but the key word above is "simulate." A computer is a very useful tool to do simulations, for business or hobby, and a lot can be learned from an accurate simulation, but the simulation must accurately mimic the actual, or it will just be misleading.

Now, let's take a close look at the program.

The lines from 210 to 560 are the subroutines that compute the random numbers. Lines 100 and 110 are the control routines which call the

various subroutines, and the lines numbered lower than 100 set things up, print the menu, and call the subroutine in 6000, which draws the border. (I'll get back to that border in a moment.)

At line 5000, the program prints the title at the top of the screen, and the message "key your choice" at the bottom. When you hit a key, the computer calls it K\$, checks it to be sure it has a value from 0-3, and then pokes it into screen memory at the right side of line 15, so you can see what you hit. The 80C then waits for another key to be hit, calls it KK\$, and concatenates it with K\$. That long word means "combine together," and it is done with the plus sign.

It looks like addition, but it's not. If 10 and 6 are numbers, and you add them with the plus sign, you get 16, but if 10 and 6 are strings, and you concatenate them, again using the plus sign, you get 106.

Try these two examples: First, type PRINT 10+6 <ENTER>. Then try PRINT "10" + "6" <ENTER>. Anything in quotes is a string, and what you get depends on whether you start with strings or numbers.

Anyway, once the computer has the numbers keyed in, it returns to the control routine, and then branches to one of the lines numbered 210 to 560, where it calculates the value of R (results). Then it goes to 5200, where the result is printed on the screen (across the bottom), while a prompt ("hit any key") is printed across the top. After you look at your results, just hit any key, like it says, and you will once again have the title and the instruction "key your choice" on the screen.

Now for more about that border. You may find line 6000 useful in other programs you write. I use it anytime I want a border drawn around the screen display.

Look at Line 10, and you will see the sequence of commands
CLS:XX=230:GOSUB 6000. The CLS

COLORTERM (c)

The 16K Color Computer* as an intelligent terminal
with 51 or 64 columns by 21 lines and lower case!

- 300 or 110 Baud
- user programmable keys
- automatic repeat when key is held down
- dump your files to host
- reverse video
- partial screen clear
- 4-way cursor control
- any data format (commercial systems, TSO, bulletins etc.)
- memory buffer for incoming data—save buffer—scroll through buffer
- preserve a "window" of any size; new material scrolls through remainder of screen.
- encode data for more secure storage
- macro buffers for often-used output
- patch the 51 or 64 column display to your own programs running above 9168 (23 D0 hex)

Cassette and Manual \$34.95 (U.S.) \$40.95 (Canadian)

Visa, Master Charge, Money Order

Martin Consulting, 94 Macalester Bay, Winnipeg, Manitoba, R3T 2X5 Canada

*TM. OF TANDY CORP.

clears the screen, of course, and the XX= gives a value to this variable that will be used in the subroutine at 6000. The subroutine uses two FOR/NEXT loops to poke the value XX into all of the memory locations representing the edges of the text screen.

You can change the appearance of the border by giving XX a different value in line 10. Any value from 0 to 255 will work. Some will make colored borders, and some will make borders composed of letters or other characters. Try the values 35, 42, and 30. By the way, the numbers are the same ones you would use with the CHR\$ statement.

On to the contest. You may have noticed that this column has no name. Well, if you have an idea for one, you can submit it, and if we pick your choice, you will win a gift certificate for \$50 in merchandise from Prickly-Pear Software. If you come in second or below, you don't win anything. There's no room for second best.

All entries must be submitted either to the Rainbow (mark the envelope "FRP Name Contest"), or to Prickly-Pear Software at the address below. Write your idea on any old piece of paper, along with your name and address. The decision of the judges will be final, and the winner will be announced in this column in August, so hurry.

Remember, if you have complaints, write to me at my P.O. Box in Saudi Arabia, or send your letter to Lonnie Falk, at the RAINBOW, and clearly mark the outside "DO NOT FORWARD." If you have comments or suggestions (or questions), write me at:

Prickly-Pear Software
3518 S. Randi Place
Tucson, AZ 85730
(602) 886-1505

```
1 *****COPYRIGHT 1982*****
2 *PRICKLY-PEAR SOFTWARE!
3 *3518 S. RANDI PLACE*
4 **TUCSON, ARIZONA**
5 *****85730*****
10 X=RND(TIMER):CLS:XX=230:GOSUB
  6000:CC$=STRING$(30," ")
20 PRINT@66,"01. 1-2 13. 2-16
  25. 4-48";:PRINT@98,"02. 1-3
  14. 2-20 26. 5-8";:PRINT@130,"0
  3. 1-4 15. 3-9 27. 5-20";:PR
  INT@162,"04. 1-6 16. 3-12 28.
  5-30";
30 PRINT@194,"05. 1-8 17. 3-18
  29. 5-40";:PRINT@226,"06. 1-10
  18. 3-24 30. 6-36";:PRINT@258
  ,"07. 1-12 19. 3-30 31. 6-48";
  :PRINT@290,"08. 1-20 20. 4-14
  32. 7-12";
```



16K
ECB

```
40 PRINT@322,"09. 2-5 21. 4-16
  33. 7-42";:PRINT@354,"10. 2-7
  22. 4-24 34. 7-56";:PRINT@386
  ,"11. 2-8 23. 4-32 35. 8-64";
  :PRINT@418,"12. 2-12 24. 4-40
  36. %ILE";
100 GOSUB 5000:R=0:ON K GOSUB 21
  0,220,230,240,250,260,270,280,29
  0,300,310,320,330,340,350,360,37
  0,380,390,400,410,420,430,440,45
  0,460,470,480,490,500,510,520,53
  0,540,550,560
110 GOSUB 5200:GOTO 100
210 R=RND(2):RETURN
220 R=RND(3):RETURN
230 R=RND(4):RETURN
240 R=RND(6):RETURN
250 R=RND(8):RETURN
260 R=RND(10):RETURN
270 R=RND(12):RETURN
280 R=RND(20):RETURN
290 R=RND(4)+1:RETURN
300 R=RND(6)+1:RETURN
310 R=RND(4)+RND(4):RETURN
320 R=RND(6)+RND(6):RETURN
330 R=RND(8)+RND(8):RETURN
340 R=RND(10)+RND(10):RETURN
350 R=RND(3)+RND(3)+RND(3):RETUR
  N
360 R=RND(4)+RND(4)+RND(4):RETUR
  N
370 R=RND(6)+RND(6)+RND(6):RETUR
  N
380 R=RND(8)+RND(8)+RND(8):RETUR
  N
390 R=RND(10)+RND(10)+RND(10):RE
  TURN
400 R=RND(6)+RND(6)+2:RETURN
410 FOR X=1 TO 4:R=R+RND(4):NEXT
  :RETURN
420 FOR X=1 TO 4:R=R+RND(6):NEXT
  :RETURN
430 FOR X=1 TO 4:R=R+RND(8):NEXT
  :RETURN
440 FOR X=1 TO 4:R=R+RND(10):NEX
  T:RETURN
450 FOR X=1 TO 4:R=R+RND(12):NEX
  T:RETURN
460 R=RND(4)+4:RETURN
470 FOR X=1 TO 5:R=R+RND(4):NEXT
  :RETURN
480 FOR X=1 TO 5:R=R+RND(6):NEXT
  :RETURN
490 FOR X=1 TO 5:R=R+RND(8):NEXT
  :RETURN
500 FOR X=1 TO 6:R=R+RND(6):NEXT
  :RETURN
510 FOR X=1 TO 6:R=R+RND(8):NEXT
  :RETURN
520 R=RND(6)+6:RETURN
530 FOR X=1 TO 7:R=R+RND(6):NEXT
  :RETURN
540 FOR X=1 TO 7:R=R+RND(8):NEXT
  :RETURN
```

(Continued on next page)

PREMIUM CASSETTES

- COMPUTER GRADE
- 100% ERROR-FREE
- FULLY GUARANTEED

MANUFACTURER PRICES



The Micro-Trac™ Generation

- High Frequency Response • Wide Dynamic Range •
- Used by Software Firms & Computer Hobbyists
- Choice of School Districts Nationwide

LENGTH	12-PAK	24-PAK
C-05.....	\$.69	\$.59
C-10.....	.79	.69
C-20.....	.99	.89
C-30.....	1.19	1.09
C-60.....	1.49	1.39
C-90.....	1.79	1.69
*CASES.....	.21	.20

*Cases recommended to protect sensitive cassettes.

—UPS SHIPPING—
(No P.O. Boxes please)
\$2.00 (12-pak) \$3.00 (24-pak)
—Canadian shipping multiply by 2—

#1 COMPUTER TAPE
IN THE USA!

—write for volume prices—

TOLL-FREE
(orders only)

1-800-426-4747
ext. 480

In Washington State
1-800-562-4555
ext. 480

MICRO-80™ INC.

2665 Busby Rural Road
Oak Harbor, WA 98277
—Distributors Wanted—



FRP (From Page 39)

```
550 FOR X=1 TO 8:R=R+RND(8):NEXT
:RETURN
560 R=RND(100):RETURN
5000 PRINT@33,CC$;:PRINT@42,"THE
DICE BAG";:PRINT@449,CC$;:PRINT
@457,"KEY YOUR CHOICE";:K$=INKEY
$
5010 K$=INKEY$:IF K$="" THEN 501
0 ELSE IF VAL(K$)>3 THEN 5010 EL
SE SOUND 150,1:POKE 1500,(VAL(K$
)+112)
5020 KK$=INKEY$:IF KK$="" THEN 5
020 ELSE SOUND 150,1:K$=K$+KK$:K
=VAL(K$):RETURN
5200 PRINT@33,CC$;:PRINT@42,"HIT
ANY KEY";:PRINT@449,CC$;:PRINT@
450,"#";:PRINTUSING"##";K;:PRINT
@458,"RESULT = ";:PRINTUSING"###
";R;:K$=INKEY$
5210 K$=INKEY$:IF K$="" THEN 521
0 ELSE SOUND 150,1:RETURN
6000 CLS:FOR X=1024 TO 1055:POKE
X,XX:POKE X+480,XX:NEXT:FOR X=1
024 TO 1504 STEP 32:POKE X,XX:PO
KE X-1,XX:NEXT:RETURN
```

Software Review...

VENTURER WILL KEEP YOU ON YOUR TOES

If you have nerves of steel, try **VENTURER**, a new arcade-type game from Aardvark-80.

Written in high-res machine language graphics, this program presents you with a series of rooms and corridors through which you move. As you enter each room, the screen "expands" to give you a full view of the room.

The rooms contain treasures and monsters. Your mission is to shoot the monsters and pick up the treasure. There's a catch, though. If you spend too much time in a room, walls will start to form and you may be trapped.

You get points for each monster shot and for each treasure. You have to kill all the monsters in a room before you can pick up a treasure.

Once you've cleaned out all the rooms on a level, you get to advance to the next. There are 63 levels.

You get three warriors to start and can earn more. You'll probably need them. The barricades which form in the rooms also appear in the corridors after you make enough progress.

This offering from Aardvark (2352 S. Commerce, Walled Lake, MI, 48088, \$19.95) is of good quality and has fine color and sound. Our only complaint is that your warrior is only a small dot while it is moving though the corridors, but that is a minor problem in a game which is full of fun and easy to play.

COLOR COMPUTER USERS

THE POWERFUL FLEX DISK OPERATING SYSTEM WITH HUNDREDS OF SOFTWARE PACKAGES IS NOW AVAILABLE!

Now you can run FLEX, OS-9 and Radio Shack disk software on your Color Computer. If you have a 32K Color Computer with the Radio Shack disk system, all you need to do is make a trivial modification to access the hidden 32K, as described in the Feb. issue of COLOR COMPUTER NEWS and the April issue of '88' Micro. You can get FLEX from us right now. OS-9 will be ready by summer. Please note that this will only work with the Radio Shack disk system and 32K/64K memory chips that RS calls 32K. Maybe they put 64K's in yours, too. If you don't have a copy of the article, send a legal size SASE (40¢ stamps) and we'll send it to you.

Using this system to run FLEX and OS-9 has many advantages. First, it gives you 48K from zero right up to FLEX. This means that ALL FLEX compatible software will run with NO MODIFICATIONS and NO PATCHES! There are no memory conflicts because we moved the screen up above FLEX which leaves the lower 48K free for user programs.

What you end up with is 48K for user programs, 8K for FLEX and another 8K above FLEX for the screens and stuff. We have a multi screen format so you can page backward to see what's scrolled by and a Hi-fies screen display is on the way. That's better than an Apple!

We also implemented a full function keyboard, with a control key and escape key. All ASCII codes can now be generated from the Color Computer keyboard!

We also added some bells and whistles to Radio Shack's Disk system when you're running FLEX or OS-9. We are supporting single or double sided, single or double density, 35, 40 and 80 track drives. If you use double sided drives, the maximum is three drives because we use the drive 3 select for side select. When you are running the Radio Shack disk, it will work with the double sided drives but it will only use one side and only 35 tracks. Using 80 track drives is okay, but will not be compatible with standard Radio Shack software. You can also set each drive's stepping rate and drive type. (SS or OS - SD or DD)

In case you don't understand how this works, I'll give you a brief explanation. The Color Computer was designed so that the roms in the system could be turned

off under software control. In a normal Color Computer this would only make it go away. However, if you put a program in memory to do something first (like boot in FLEX or OS-9), when you turn off the roms, you will have a full 64K RAM System with which to run your program. Now, we need the other half of the 64K ram chips to work, and this seems to be the case most of the time, as the article states. Of course, you could also put 64K chips in.

Some neat utilities are included.

MOVEROM moves Color Basic from ROM to RAM. Because it's moved to RAM you can not only access it from FLEX, you can run it and even change it!! You can load Color Computer cassette software and save it to FLEX disk. Single Drive Copy, Format and Setup commands plus an online help system are included.

Installing FLEX is simple. Insert the disk and type:

RUN "FLEX"

That's all there is to it! You are now up and running in the most popular disk operating system for the 6800. There are hundreds of software packages now running under the FLEX system. Open your Color Computer to a whole new world of software with FLEX.

FLEX \$99.00
INCLUDES OVER 25 UTILITIES!

Other languages available include: FORTH, Pascal, Fortran77, C, A/BASIC compiler, plus more. Application packages include: A/R, G/L, A/P, Inventory, Electronic Spreadsheets, Accounting, Database programs and more. SEND FOR LIST.

TRS-80 COLOR COMPUTER COMPLETE WITH 64K RAM, 24K ROM, SINGLE DISK DRIVE AND FLEX, SET UP AND READY TO RUN FOR ONLY \$1,275. Includes 60 day extended warranty. If you have a Computer, call about RS disk controllers and drives.

AUTOTASK

WITH MENU

AUTOTASK with MENU is a revolutionary new concept designed to overcome the problems and frustrations which confront the non-technical when using a computer. Users are greeted with a series of self-prompting interactive menus linking directly to the application. Several example menus are provided. You can create your own menus from simple text files. AUTOTASK with MENU gives you unlimited software flexibility by providing a system to coordinate multiple application programs.

Bundle several different software packages to present a coordinated system to the user. AUTOTASK with MENU is compatible with all FLEX compatible software. It uses very little memory and is easy to learn.

PRICE \$129.95

Includes source on disk!

Manual \$10.00

6502 TRANSLATOR

Translator 6502 code to 6809
\$75.00

INVENTORY
with MATERIAL
REQUISITION PLANNING
\$100.00

SUPER SLEUTH

Disassembler for 6800/6809 or Z80
\$99.00

TABULA RASA
Electronic Spreadsheet
\$100.00

TRS-80 COLOR COMPUTER

FORTH FOR THE TRS-80 COLOR COMPUTER DISK SYSTEM

Trying to get control of your Color Computer?? Tired of translating HEX to decimal?? Tired of remembering where the VDG and SAM are and how to program them?? Want to write machine language code with assembly language mnemonics instead of POKES?? Want to write programs in half the time?? Want to write lots of small pieces of code that you can put together in seconds to do BIG JOBS?? Want a language that is at least 5 to 10 times faster than BASIC?? Want to learn everything there is to know about FORTH, with the best manual on the market, including lots of examples of FORTH applications, and detailed explanations of how everything works??

CC FORTH IS THE ANSWER!!
Includes Editor, 6809 Assembler
String Functions, Disk Data File
Operations and Much Much More!

\$99.95

FORTH

FLEX COMPATIBLE FORTH

BY Chuck Eaker, Ph.D.
X-FORTH NOTES

Supplied on one 8" disk or 2 5 1/4" disks,
with a 400+ page manual.

Disk(s) have the source of everything but the core.
PRICE only \$149.95 plus \$2.50 S&H
Manual available separately for \$49.95 plus \$2.50 S&H

SOFTWARE CATALOG

PROGRAM	OBJECT/WITH ONLY/SOURCE	code
BILLPAYER	169.95	x
PLOT	44.95	x
TABULA RASA	100.00	x
Mailing List	99.95	x
Forms Display	49.95	x
Inventory with Material	100.00	x
Requisition Planning	69.95	x
Some Common BASIC Programs	99.00	
FLEX For Color Computer	149.95	8 & 9
X-FORTH (FLEX)	99.95	9
CC-FORTH (TRS-80 Color)	49.95	69.95
TOOLKIT #1 (BASIC)	49.95	69.95
TOOLKIT #2	129.95	9
AUTOTASK	150.00	9
A/BASIC Compiler	49.95	69.95
Extended Utilities	69.95	89.95
Password Protection	139.95	9
CRASMB (X Assembler)	25.00	50.00 9 ea
Personality Modules (1 INC)	6502, 6800, 6805, 6809, Z80, 8080, 1802	
READTAPE	199.00	299.00
SPELLTEST	54.95	74.95 8 & 9
READTEST	39.95	59.95 8 & 9
ESTHER	29.95	49.95 8 & 9
HELP	49.95	89.95 8 & 9
Job Control Program	59.95	89.95
DYNASOFT PASCAL (FLEX)	69.95	99.95
DYNASOFT PASCAL (OS-9)	125.00	P
DYNASTAR Screen Editor (OS-9)	149.95	9
SUPER SLEUTH (6800/6809)	99.00	8 & 9
SUPER SLEUTH (Z80)	99.00	8 & 9
CROSS Assembler Macros for TSC ASMB	49.95	each
6800/1, 6805, 6502, Z80, 8080/5	99.95	
3 FOR	75.00	9
6502 Translator	75.00	9 ea
Debugging Simulators 6805 or 6502	295.00	9
STYLOGRAPH 2.0	125.00	9
STYLOGRAPH MAIL MERGE	145.00	9
STYLOGRAPH Spelling Checker		9

CODE X = XBASIC, 9 = 6809, 8 = 6800, P = PASCAL

Software by Technical Systems Consultants, Inc.	150.00
FlexTM (includes Editor & Assembler)	
UniFLEXTM (includes one year maintenance and update)	450.00
Editor	50.00
Assembler	250.00
6800 Gross Assembler on 6809	75.00
Text Processor	100.00
Extended Basic	50.00
Basic Precompiler (specify standard or extended)	200.00
Pascal (FlexTM)	
Pascal (UniFLEXTM) (Add \$75.00 for one year's maintenance and update)	225.00
SoftMerge Package	75.00
6809 FlexTM Utilities	75.00
Debug Package	75.00
Diagnostic Package	75.00
Software by Microware Systems Corp.	
OS-9 TM Level One	200.00
Operating System	
OS-9 TM Level Two	500.00
Operating System	200.00
BASIC9TM	125.00
OS-9TM Macro Text Editor	125.00
OS-9TM Interactive Assembler	
OS-9TM Interactive Debugger	50.00
(Disk version)	895.00
CIS Cobol Compiler	400.00
Pascal Compiler	

USA add \$2.50 for standard UPS shipping & handling
Foreign orders add 20% Airmail
Specify 5" or 8" disk and 6800 or 6809
VISA—MASTER CHARGE—DINERS CLUB ACCEPTED

OUR SOFTWARE IS GIMIX COMPATIBLE

HARDWARE CATALOG

Terminal	Cash	Credit
TVI	910	588.50
TVI	912/C	709.00
TVI	920/C	758.00
TVI	925	759.00
TVI	950	978.00
Zenith	219	700.00
SOROC	10130	589.00
SOROC	10135	765.00
SOROC	10135G	831.00

Printer	Cash	Credit
IDS	445	632.50
IDS	460G	852.50
IDS	560G	1094.50
Centronics	739	519.00
Centronics	739-3	641.50
TI	820	1738.00

All printers and terminals are shipped freight collect and there are no COD's.

**FRANK HOGG
LABORATORY**
130 MIDTOWN PLAZA
SYRACUSE, NY 13210 (315) 474-7856

Tutorial...

16K
ECBGETTING MORE
FROM PMODE 4

By H. Allen Curtis

Radio Shack's Color Computer manual, *Going Ahead with Extended Color BASIC*, provides the following information about PMODE 4: PMODE 4 has the highest graphics screen resolution with a grid size of 256 x 192. PMODE 4 requires four video pages and is a 2-color combination mode. It has two color sets, 0 and 1. Set 0 is given as black and green but it is actually dark green and green. Set 1 is black and buff.

The purpose of this article is to demonstrate that PMODE 4 has six OTHER color sets, two of which are 2-color combinations and four are 4-color combinations. Several very short programs will be used to establish the existence of these additional color combinations. To get the full benefit of the presentation and discussion of each program the reader should key in the program and run it.

The program in Listing 1 proves the existence of the 2-color combination, buff and orange, for PMODE 4. In that listing, line 10 clears the screen to cyan in color set 1 of PMODE 3. Line 20 is a delay to keep cyan on the screen.

Listing 1

```
10 PCLEAR4:PMODE3:PCLS2:SCREEN1,1
20 FORI=1TO500:NEXT
30 PMODE4
40 FORC=0TO8:PCLSC:FORI=1TO500:NEXT:NEXT
```

Line 30 switches from PMODE 3 to PMODE 4. LINE 40 successively clears the screen to the colors in PMODE 4 corresponding to the full set of color numbers, 0 through 8. The colors are seen to be buff for all even numbers and orange for all the odd numbers. Thus, it has now been proved that PMODE 4 does, indeed, have the 2-color combination, buff and orange.

Changing SCREEN1,1 to SCREEN1,0 in line 10 and then running the altered program proves that PMODE 4 also has the 2-color combination, green and red.

The program of Listing 2 shows that for the green and red color combination PMODE 4 has a higher resolution than does PMODE 3. Hence, it shows that the resolution of PMODE 4 has not been diminished for the "new" 2-color combination.

Listing 2

```
10 PCLEAR4:PMODE3:PCLS4:SCREEN1,0
20 CIRCLE(38,96),30,2,3
30 PMODE4
40 CIRCLE(138,96),30,2,3
50 GOTO50
```

Line 10 of Listing 2 clears the screen to red in the color set 0 of PMODE 3. Line 20 draws in PMODE 3 an ellipse outlined in yellow. Line 30 switches to PMODE 4. Line 40 draws in PMODE 4 a FINER ellipse outlined in green. The fact that the latter ellipse is more finely drawn demonstrates that PMODE 4 has a higher resolution than PMODE 3. Changing SCREEN1,0 to SCREEN1,1 in line 10 of Listing 2 and running the program shows for the buff and orange color combination that PMODE 4 also has a higher resolution than PMODE 3.

The program of Listing 3 indicates that one can use DRAW, PAINT, GET, PUT and LINE for the "new" 2-color combinations in the same manner as for the "old" ones.

Listing 3

```
10 PCLEAR4:PMODE3:PCLS:SCREEN1,1
20 PMODE4
30 DIMA(21)
40 DRAW"BMS0,50E20F20L40"
50 PAINT(70,40),1,1
60 GET(50,30)-(90,50),A,6
70 PUT(180,145)-(220,165),A,PSET
80 LINE(10,80)-(30,140),PSET
90 LINE(50,80)-(70,140),PSET,BF
100 GOTO100
```

Line 10 clears the screen to buff in PMODE 3. Line 20 switches to PMODE 4. Line 30 is used in conjunction with GET and PUT of lines 60 and 70. Line 40 draws a triangle and line 50 paints the triangle orange. Lines 60 and 70 send a replica of the painted triangle to another portion of the screen. Line 80 uses LINE to draw a slanted line. Finally, line 90 draws an orange rectangle. Replacement of SCREEN1,1 with SCREEN1,0 and running the program shows that the statements DRAW, PAINT, GET, PUT and LINE work for the color combination, green and red, in the same manner as they do for buff and orange.

The program of Listing 3 is far from exhaustive and certainly does not show that the aforementioned statements will work properly for all possible situations. If such a program could be written, it would be prohibitively long for this article.

In summary, the programs of

(Continued on Page 44)



EVERY DAY MORE PEOPLE LEARN THE NAME OF THE ONE SOFTWARE COMPANY THAT MORE COLOR COMPUTER OWNERS HAVE GOTTEN SOFTWARE FROM THAN ALL THE OTHER COMPANIES COMBINED: THE ONE COMPANY THAT HAS GIVEN AWAY THOUSANDS OF FREE PROGRAMS THAT ARE SUPERIOR TO SOME YOU MIGHT PAY FOR!

ISN'T IT TIME YOU KNEW TOO?

ILLUSTRATED MEMORY BANKS: IMB WILL SEND YOU A SHORT SAMPLE PROGRAM & OUR NEW COLOR EXT. BASIC SOFTWARE LIST WHEN YOU SEND US A BUSINESS SIZED SASE.

WORDCLONE

Color WordClone makes word processing simple. This program can be used with tape or disk and provides you with real UPPER and LOWERCASE letters with descenders (plus 50 letters by 24 lines on the screen at one time!) Why pay more when this is all you really need? JUST \$18.95 SUPPLIED ON TAPE. (Min. 16k Ext. Basic). USER MODIFIABLE !!!!

\$18.95



\$18.95
EACH



16K Extended Color Basic Tape Programs
CREATAVADER - create your own targets or choose from a menu of predesigned 4 color targets.
GATOR ZONE - battle against alien 'preppy gators' before they eat your shirts. (IMB original).
KOSMIC KAMIKAZE - our best selling hi-res., deep space arcade game which THE RAINBOW called '...the best spaceship graphics we have seen in a non-machine language program.'
 many more titles available, including **STAR SIEGE PLUS**, **GALLOPING GAMBLERS**, **SELECT-A-GAME**, **STARBASE ATTACK**, **METEOR STORM**, plus new releases coming.

IMB

illustrated memory banks
P.O. BOX 289
WILLIAMSTOWN, MA. 01267-0289

VISA & MASTER CARD ACCEPTED.
 CALL (413) 663-9648 3-7 PM EST.

SPECIAL OFFER: Mention this magazine ad and select a FREE program for every two programs you order !!!

PMODE4 (From Page 42)

Listings 1, 2 and 3 show that PMODE 4 has two additional color combinations at the highest resolution and that the Color Computer graphics statements appear to work properly with these sets.

It will be shown shortly that PMODE 4 has four 4-color combinations. For the sake of brevity they will be referred to as color sets A, B, C and D. The sets are as follows:

- A. Green, yellow, blue and red
- B. Buff, cyan, magenta and orange
- C. Dark green, medium green, gray and green.
- D. Black, orange, cyan and buff

Color sets C and D were previously brought to public notice by Jack Swindell in the January 1982 issue of *Chromasette Magazine*.

The program of Listing 4 serves to demonstrate that PMODE 4 has the color set A.

Listing 4

```
10 PCLEAR4:PMODE3:PCLS:SCREEN1,0
20 FORC=2T04:COLORC,1
30 LINE(C#64-64,0)-(C#64,191),PSET,BF:NEXT
40 PMODE4
100 GOTO100
```

Line 10 of Listing 4 clears the screen to green in PMODE 3. Lines 20 and 30 draw colored "boxes" that divide the screen into four equally sized sections which are from left to

right green, yellow, blue and red. Line 40 switches to PMODE 4. The four colors remain unchanged on the screen. Therefore, PMODE 4 does, indeed, have the color set A.

Replacing SCREEN1,0 with SCREEN1,1 in line 10 and running the program shows that PMODE 4 also has the color set B.

To prove that PMODE 4 has the color set C add the following line to the program of Listing 4 and then run it:

```
50 SCREEN1,0
```

Changing SCREEN1,0 to SCREEN1,1 in line 50 and running the altered program similarly demonstrates that PMODE 4 has the color set D.

There are limitations on the use of the color sets A, B, C and D. For instance, A, B, C and D are fundamentally the 2-color sets, green and red, buff and orange, dark green and green, and black and buff, respectively. Hence, one must use only colors from the 2-color sets to outline and paint all drawn geometric figures. Other limitations will be brought out in ensuing programs.

Consider the program of Listing 5

Listing 5

```
10 PCLEAR4:PMODE3:PCLS:SCREEN1,0
20 FORCE=2T04:COLORC,1
30 LINE(C#64-64,0)-(C#64,191),PSET,BF:NEXT
40 PMODE4
50 FORX=30T0225STEP64:CIRCLE(X,96),25:NEXT:CIRCLE(X-64,96),
25,2
100 GOTO100
```

which is a replica of the program of Listing 4 except for line 50. The purpose of line 50 is to draw circles in the four differently colored sections of the screen. It is found to be successful in drawing COMPLETE circles only in the green and red sections, the colors belonging to one of the 2-color combinations of PMODE 4. When SCREEN1,0 is changed to SCREEN1,1 in line 10, it is seen that circles can be drawn in their entirety only on buff and orange, but not on cyan or magenta.

PAINTing is radically different when colors besides those belonging to one of the 2-color sets of PMODE 4 are on the screen. The illustration of this fact is facilitated by adding the following line to the program of Listing 5 in its original form:

```
60 PAINT(10,150),1,1
```

Before running the amended

**TRANS
TEK**

Color Computer Software Specialists

C. C. Writer

The first and last word in Color Computer word processing. See the January RAINBOW for a Review of this powerful program YOU can modify. Now available for disk too! 16-32K cassette-\$35. 32K Disk-\$40

Check Rec Plus

Reconciles your Checkbook AND allows you to keep Memo Entries of cash and credit card expenses without affecting your Checkbook balance. A "mini" General Ledger! Includes Systems/Storage Binder with full Documentation. 16-32K Cassette, \$45 16-32K Disk, \$45

C.C. Mailer

Mailing lists are a natural for the Color Computer and you add the ability to merge SELECTED Names and Addresses with your C.C. Writer Letters and you really have some Power. C.C. Mailer-\$20 With C.C. Merger-\$35

For information, product list, or orders write to...

TransTek BSC 2-6
194 Lockwood
Bloomington, IL 60108

program, one would have reason to predict that, except for the interior of the leftmost circle and the outline of the rightmost circle, all the screen would be painted red. This is not the case. The running of the program shows that painting is stopped surprisingly enough at the yellow boundary.

Another surprise occurs when the program is run when the coordinate 10 in line 60 is changed to 75. With this change, painting might be expected to occur in the yellow section of the screen. However, no painting whatsoever occurs when the program is run. Next, try running the program with the coordinate 75 changed to 100. Painting should still be expected to occur in the yellow section. Running the program now shows that merely a vertical line extending from the bottom of the yellow section to the circle is "painted" on the screen.

The examples given should be sufficient to establish the unpredictability of PAINTING when there are present colors not in the 2-color sets of PMODE 4.

The LINE, GET and PUT statements seem to work as expected for the 4-color sets of PMODE 4. Of course, LINE can only use colors from a PMODE 4 2-color set. In the case of GET and PUT, whatever the color or colors graphics figure is can apparently be moved precisely as it would for a 4-color combination of PMODE 3. The reader may find it worthwhile to devise short programs to test LINE, GET and PUT statement usage with the color sets A, B, C and D of PMODE 4.

Based on the findings already described, the following procedure is recommended when using the color sets A, B, C and D:

1) If any "fine" (high resolution) drawings are required, restrict their colors to those in a 2-color set.
2) Do as much drawing and painting in PMODE 3 as possible before switching to PMODE 4.

3) Generally, confine all fine drawings and their painting to sections of the screen on which the colors belong to a 2-color set.

4) Feel free to use GET and PUT for animation in PMODE 4.

It might be said that the 4-color sets discussed thus far are indirect color sets of PMODE 4 because programming in PMODE 3 must precede that in PMODE 4. Two of the sets, C and D, can be obtained directly, that is, without recourse to PMODE 3 usage. The program of Listing 6 is used to prove that the sets C and D can be directly derived.

Listing 6

```
10 PCLEAR4:PMODE4:PCLS:SCREEN1,0
20 DRAW"BM20,50D20R2U20R2D20"
30 DRAW"BM21,80D20R2U20R2D20"
40 GOTO40
```

Line 10 of Listing 6 clears the screen to dark green in PMODE 4's 2-color set, dark green and green. Each of line 20 and 30 draws a colored rectangle on the screen. One of the rectangles is gray and the other is medium green. When SCREEN1,0 of line 10 is changed to SCREEN1,1 and the program run, rectangles colored cyan and orange are observed to be drawn. Thus, the sets C and D have been obtained without a prior use of PMODE 3.

There is a yet-to-be-solved mystery associated with the direct sets C and D of PMODE 4. The mystery is this: Suppose a program is written in which X objects are drawn in cyan and Y objects in orange. The next time this program is loaded and run the X objects MAY be orange and the Y objects cyan. Sometimes this color change can be achieved by a repeated depressing of the RESET button and then running the program again. Whether an object is drawn as gray or medium green of set C or as cyan or orange of set D appears to depend on the current state of some input/output circuit.

(Continued on next page)

FOR A LIMITED TIME ONLY

10% OFF

ON ALL COMPUTERWARE TAPES WE STOCK INCLUDING:

PAC ATTACK (Better than original)	\$24.95	\$22.45
STORM (A Real Tempest)	\$24.95	\$22.45
COLOR INVADERS	\$24.95	\$22.45

TOM MIX SOFTWARE

★NEW★ **WAR KINGS** (Lords?) ★NEW★

Excellent at **\$19.95**

MOON LANDER* **\$15.95**

MARK DATA PRODUCTS

BERSERK (Watch out for Evil Orull One or two players) **\$24.95**

BLACK SANCTUM (Fantasy) **\$19.95**

*Requires 16K Ext. Basic - Others 16K Std. Basic Minimum.

More games, educational & financial programs.

Call or Write for free catalog.

WE PAY postage on orders over \$12.00 (In USA).

Allow 2 to 3 Weeks for personal checks.

Add \$1.50 for C.O.D.

ENDICOTT SOFTWARE

(205) 883-5142

P.O. Box 12543

Huntsville, AL 35802

PMODE4 (From Page 45)

In the program of Listing 6 the rectangle of line 20 will always be in a color different from the rectangle of line 30 regardless of the current state of the input/output circuitry of the Color Computer. The fact that the leftmost horizontal coordinate of the drawing of line 20 is an even number and that of line 30 is odd is the determining factor in assuring a color difference. In lines 20 and 30 each of the drawings spans 5 points horizontally. Every other one of these points is drawn. Drawing every other point is what yields one of the colors cyan, orange, gray or medium green.

The program of Listing 7 demonstrates that all lines, having even leftmost points and every other point drawn, are of the same color.

Listing 7

```
10 PCLEAR4:PMODE4:COLOR0,1:PCLS:SCREEN1,1
20 X=RND(255):Y=RND(191):Z=X+RND(255)
30 IFX/2>INT(X/2)THENX=X-1
40 LINE(X,Y)-(X,Y),PSET
50 X=X+2:IFX(Z AND X(256)THEN40
60 FORI=1TO500:NEXT:PCLS:GOTO20
```

Line 10 of the listing clears the screen to buff and makes the foreground color black. Line 20 sets random coordinates: X is a random horizontal coordinate, Y a random vertical coordinate, and Z a random coordinate determining the end of the line to be drawn by lines 40 and 50.

Line 30 makes X even. Lines 40 and 50 draw a line of which only its even points are drawn. Line 60 supplies a delay before clearing the screen to buff again and returning to line 20. Running the program shows that all lines drawn on the screen are of the same color, orange or cyan.

If the relation > in line 30 is replaced by = then lines 40 and 50 will draw a line having only its odd points drawn. Running the changed program produces lines that are all colored cyan (or orange) if previously the program drew orange (cyan) lines.

The program of Listing 8 illustrates how a geometric figure can be drawn, painted and moved using the direct color set D of PMODE 4.

Listing 8

```
10 PCLEAR4:PMODE4:COLOR0,1:PCLS:SCREEN1,1
20 A=1:B=126:X=B:Y=96:Z=1
30 LINE(X,Y)-(X,Y),PSET
40 X=X+2:Z=Z+1:IFZ<=A THEN30
50 A=A+2:B=B-2:X=B:Y=Y+1:Z=1:IFB>100THEN30
60 DIMC(15)
70 GET(102,96)-(150,100),C,G
80 FORI=1TO60:NEXT
90 PUT(202,15)-(250,27),C,PSET
100 FORI=1TO600:NEXT
110 PUT(33,126)-(81,138),C,PSET
120 GOTO120
```

Line 10 of the listing clears the screen to buff and makes the foreground color black. Line 20 initializes control variables A, B and Z as well as the coordinate variables X and Y. Lines 30, 40 and 50 draw a triangle that is painted orange or cyan. Lines 60 through 90, with a short delay, copy the triangle at another part of the screen. Lines 100 and 110, with another delay, copy the triangle, but with a color change, at another portion of the screen. Because it is already known how to draw, paint and move black objects in PMODE 4, the program concentrates on the colors cyan and orange.

Note that the triangle of lines 30, 40 and 50 has only its even horizontal coordinates drawn. When it is moved to a location in which those coordinates are still even, the triangle retains its original color. However, if the location is such that those coordinates are odd, the triangle changes color. In general, a move that preserves the evenness or oddness of the horizontal coordinates of a drawn object will also preserve the color.

It is hoped that the presentation of this article with demonstrative programs will stimulate the reader towards getting more color out of PMODE 4.

TEXT EDITOR

by John Waclo

WORD PROCESSOR FOR THE COLOR COMPUTER
Reviewed in RAINBOW AND CCN

With the TEXT EDITOR, letters, mailing lists, articles, and reports are a snap. Even form letters, with inserts, are easy using the exclusive Variable Text feature. This software has all the features you want...

- Excellent Text Display
- Block—Text Moves
- Global Word Exchange
- Auto Line Centering
- Text Justification
- Variable Text Inserts
- ...and much more!





Requires 32K / Extended Basic
\$49.95 Tape -- \$59.95 Disk
with Manual

from ELITE Software

Box 11224

Pittsburgh, PA 15238



<p>FUN - 3 - PAC Three games for the color. Ultra-Mind Hangman (2 versions) & Space Evader. 4K & Up \$9.95</p>	<p>SHIP WREK Perils aplenty in this adventure. Can you escape? There are even treasures to be found, if you live that long! 16K & Up \$14.95</p>	<p>WAR KING A duel to the end. Quick action can win victory in this two player graphic mach. language arcade game. 16K & Up \$19.95</p>
<p> LUNAR LANDER Pick a planet, any planet. Now try to land in this 1-4 player graphic arcade game. 16K & Up (Ext.) \$15.95</p>	<p> DANCING DEVIL Teach this little devil how to dance, compose music too. Or just watch and listen to what he already knows. Musical animation machine language. 16K & Up \$14.95</p>	<p>BOXCARS (Craps) The dice handler eyes you and says, "Place your bet!" . . . The shake, the roll . . . Graphic animation. 16K & Up (Ext.) \$14.95</p>
<p>MAILING LABELS 480 tractor feed single labels with "Mail List" basic program listing. Great for clubs. \$5.95</p>	<p>SEA BATTLE Battleship for the color. Hide your ships and fire. Two player graphic strategy game. 16K & Up \$14.95</p>	<p> ML RABBIT Back up machine language programs. Don't worry about start, end, or exec address. Let the Rabbit do what it does best. 4K & Up \$14.95</p>
		<p> WORD CC7 Proves word processors don't have to cost \$17,000. Yet keeps all the features. If you have a printer, you'll love Word CC7. 16K & Up (Ext.) \$19.95</p>



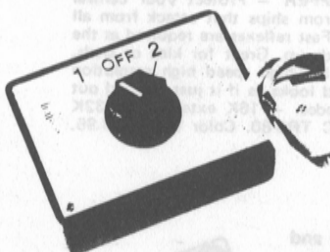
DSL COMPUTER PRODUCTS

P.O. BOX 1113 - DEARBORN, MI 48121 - (313) 582-3406

ALWAYS LOOKING FOR GREAT CC SOFTWARE
ADD \$1 SHIPPING & HANDLING - MI RES. ADD 4%



RS-232 SWITCHER
STOP STRAINING YOUR CONNECTORS. USE ...



Up to 2 items connect to your 232 port. Flip switch for different items and leave the plugs alone.

\$29.95

GEO-STUDIES



Educational software that is far above the rest. Graphic maps and arcade controls add a new dimension to your color computer. Four studies, USA, Canada, Europe, Australia, \$19.95 each.

16K & Up (Ext.) All Four \$68

RAM SLAM

The easy way to more K solderless — 1 year warranty.

4 - 16K	\$25.00
16 - 32K	\$49.95
4 - 32K	\$74.95

ELIMINATE THE 4K COMPUTER

The 4K color is a great way to start into this fascinating field. However, 4K is not enough to run a lot of great software. For June & July, DSL Computer Products is offering a \$6 bounty on 4K C.C.'s. Send \$19.00 and this coupon and get our high quality 16K Ram Slam Memory Kit.

These are not bargain chips. They carry our highly valued 1 year warranty.

QUALITY SOFTWARE FOR TRS-80 COLOR AND OSI



ADVENTURES!!!

For TRS-80 COLOR and OSI. These Adventures are written in BASIC, are full featured, fast action, full plotted adventures that take 30-50 hours to play. (Adventures are inter-active fantasies. It's like reading a book except that you are the main character as you give the computer commands like "Look in the Coffin" and "Light the torch.")

Adventures require 16K on COLOR-80 and TRS-80. They sell for \$14.95 each.

ESCAPE FROM MARS

(by Rodger Olsen)

This ADVENTURE takes place on the RED PLANET. You'll have to explore a Martian city and deal with possibly hostile aliens to survive this one. A good first adventure.

PYRAMID (by Rodger Olsen)

This is our most challenging ADVENTURE. It is a treasure hunt in a pyramid full of problems. Exciting and tough!

TREK ADVENTURE (by Bob Retelle)

This one takes place aboard a familiar starship. The crew has left for good reasons — but they forgot to take you, and now you are in deep trouble.

NEW!!

CIRCLE WORLD — We got Kzinti and puppeteers and problems. Our newest and biggest adventure. Requires 12k on OSI and 16K on TRS-80 Color.

NUCLEAR SUB — You are trapped in a nuclear sub at the bottom of the ocean. Escape and even survival is in doubt. Plotted by three of the most sadistic — I mean "creative" minds in adventure programming.



VENTURER!—A fast action all machine code Arcade game that feels like an adventure. Go berserk as you sneak past the DREADED HALL MONSTERS to gather treasure in room after room, killing the NASTIES as you go. Great color, high res graphics, sound and Joystick game for the TRS-80 Color or OSI machines. (black and white and silent on OSI.) Tape only. \$19.95.

BASIC THAT ZOOMS!!

AT LAST AN AFFORDABLE COMPILER FOR OSI AND TRS-80 COLOR MACHINES!!! The compiler allows you to write your programs in easy BASIC and then automatically generates a machine code equivalent that runs 50 to 150 times faster.

It does have some limitations. It takes at least 8K of RAM to run the compiler and it does only support a subset of BASIC—about 20 commands including FOR, NEXT, END, GOSUB, GOTO, RETURN, END, PRINT, STOP, USR(X), PEEK, POKE, *, /, +, -, ., X, X, =, VARIABLE NAMES A-Z, A SUBSCRIPTED VARIABLE, and INTEGER NUMBERS FROM 0-64K.

TINY COMPILER is written in BASIC. It generates native, relocatable 6502 or 6809 code. It comes with a 20 page manual and can be modified or augmented by the user. \$24.95 on tape or disk for OSI or TRS-80 Color.

LABYRINTH — 16K EXTENDED COLOR BASIC — With amazing 3D graphics, you fight your way through a maze facing real time monsters. The graphics are real enough to cause claustrophobia. The most realistic game that I have ever seen on either system. \$14.95. (8K on OSI)



PROGRAMMERS!

SEE YOUR PROGRAM IN THIS SPACE!! Aardvark traditionally pays the highest commissions in the industry and gives programs the widest possible coverage. Quality is the keyword. If your program is good and you want it presented by the best, send it to Aardvark.

Please specify system on all orders

This is only a partial listing of what we have to offer. We have arcade and thinking games, utilities and business programs for the OSI and TRS-80 Color. We add new programs every week. Send \$1.00 for our complete catalog.



QUEST — A NEW IDEA IN ADVENTURE GAMES! Different from all the others. Quest is played on a computer generated map of Alesia. Your job is to gather men and supplies by combat, bargaining, exploration of ruins and temples and outright banditry. When your force is strong enough, you attack the Citadel of Moorlock in a life or death battle to the finish. Playable in 2 to 5 hours, this one is different every time. 16K COLOR-80 OR TRS-80. ONLY \$14.95.



SPACE ZAPPER — Protect your central Star Base from ships that attack from all four sides. Fast reflexes are required as the action speeds up. Great for kids or Dads. This game has high speed high resolution graphics and looks as if it just stepped out of the arcades. — 16K extended or 32K disk. BASIC TRS-80. Color only. \$14.95.

TRS 80 COLOR

2352 S. Commerce, Walled Lake, MI 48088
(313) 669-3110

OSI

Game...

**SWAMP WARS CAN WIN
YOUR CROIX DE LILYPAD**16K
ECB

If you always wanted to be a frog (some of them change into handsome prices, you know), there is your chance.

This color game from IMB, Illustrated Memory Banks, is a rapid color high-res graphic offering called **SWAMP WARS**.

This game was designed with the joint contribution of Drury High School students (North Adams, MA), Robert Dobbert (**SKY-EYE**) and Dale (**SNAIL INVADERS**, **MILD WEB**) Haggerty. This game utilizes some very fancy tricks on the title cards and keeps the graphic screen turned off until the high-res graphics are completed.

In **SWAMP WARS**, you are a huge frog floating in a swamp. Your right joystick controls your tongue which is whipped out by pressing the fire button. You must try to grab as many waterbugs as you can before you get zapped by an avenging kamikaze mosquito. (Don't try to hit him: you can't).

The mosquito will appear at random. Once he has zapped you five times, the game ends and the screen will show your score. You need only press the fire button to replay the game.

Here are a few tips to help you out:

Make sure that you copy every line exactly as it appears. Every month we receive phone calls from readers who have made typographical errors in entering the lines.

This game does not require the CPU speed up. It is fast enough without it. If you wish, you may include `POKE65495,0` if you wish the game to be even faster. (This might help during title cards which do stay on rather long while the complex graphics are being drawn.)

Make sure you save the program to tape before trying a speed-up with `CSAVE"SWAMPWRS"`.

As with all the IBM games shown in the **RAINBOW**, this game is for your own use, and may not be reproduced for any other purpose without permission.

```
1 CLEAR500:DIM M(17):C=2:CLS0:P$
=CHR$(128):FORI=2TO14:FORJ=4TO13
:SET(J,I,C):NEXTJ:NEXTI
```

```
2 C=8:FORK=0TO11STEP11:FORJ=18TO
23:SET(J+K,2,C):NEXTJ:FORJ=17TO2
4:SET(J+K,3,C):NEXTJ:FORI=4TO14:
FORJ=16TO25:SET(J+K,I,C):NEXTJ:N
EXTI:NEXTK
3 C=7:FORK=0TO7STEP7:FORJ=39TO58
:FORI=2TO7:SET(J,I+K,C):NEXTI:NE
XTJ:FORI=3TO6:SET(59,I+K,C):NEXT
I:FORI=4TO5:SET(60,I+K,C):NEXTI:
NEXTK
4 FORY=1TO28:READA:IL$=IL$+CHR$(
A):NEXT
5 FORS=1TO28:FORU=15TO8STEP-1:IF
U=15THEN6ELSEPRINT$(U+1)*32+15-2
8/2+S,P$;
6 PRINT$U*32+15-14+S,MID$(IL$,S,
1);:NEXTU,S
7 FORY=1TO22:READA:BG$=BG$+CHR$(
A):NEXT
8 FORS=1TO22:FORU=15TO10STEP-1:I
FU=15THEN9ELSEPRINT$(U+1)*32+4+S
,P$;
9 PRINT$U*32+4+S,MID$(BG$,S,1);:
NEXTU,S
10 FORY=1TO28:READA:FD$=FD$+CHR$(
A):NEXT
11 FORS=1TO28:FORU=15TO12STEP-1:
IFU=15THEN12ELSEPRINT$(U+1)*32+1
+S,P$;
12 PRINT$U*32+1+S,MID$(FD$,S,1);
:NEXTU,S
13 FORY=1TO18:READA:DH$=DH$+CHR$(
A):NEXT
14 FORS=1TO18:FORU=15TO14STEP-1:
IFU=15THEN15ELSEPRINT$(U+1)*32+6
+S,P$;
15 PRINT$U*32+6+S,MID$(DH$,S,1);
:NEXTU,S:SOUND100,3:SOUND50,1
16 DATA105,108,108,117,115,113,1
14,97,116,101,100,128,128,128,10
9,101,109,111,114,121,128,128,12
8,98,97,110,107,115
17 DATA99,111,108,111,114,128,99
,111,109,112,117,116,101,114,128
,103,97,109,101,128,98,121
18 DATA102,114,101,100,128,115,9
9,101,114,98,111,128,128,128,114
,111,98,101,114,116,128,100,111,
98,98,101,114,116
19 DATA97,110,100,128,128,100,97
,108,101,128,104,97,103,103,101,
114,116,121
20 PMODE3,1:PCLS2:SCREEN0,0
21 DRAW"SB8M0,136C1BRUE2ER2ER2EU
E3RERERER2ER6ER11E2R3FR3F2DLNH3R
4FRFRF2NL13D2GL4GL3G2LG3L2GL2G3L
NG2F4R9DGL2GLHL5H4L8H2U3E2R3BU2B
L3LBG2D3F7G2D3FREU2RDFRU3F2RUH3L
U3BL5L5DRGDF2DGLHUGD4GLHU6G2DL2H
UE2U4H2LH2LHUE2"
22 PAINT(2,2),1,1
23 FORI=1TO120:PSET(RND(100),RND
(40)+100,4):NEXT
```

(Continued on next page)

SWAMP WARS (From Page 49)

```

24 DRAW"S4BM0,100C2R255":PAINT(2,134),3,2
25 CIRCLE(88,110),4,3,.9:M$="NG7HEHGC4NG4NH9C3EUR2E2U3F3R2C4E7R2F2DFDND3G3L3NG3BR6DG4L6GDC3F13D2L2BD4C2H12U4C3NF12H3LD15NF10U10L2HUL"
26 C=8:CLS0:FORI=0TO14:SET(I,15,C):NEXT:FORI=6TO14:SET(I,12,C):NEXT
EXT
27 FORI=6TO19:SET(I,9,C):NEXT:FORI=18TO27:SET(I,15,C):NEXT
28 DRAW"S4BM0,136C2R20BR50R185BM0,100C1R255"
29 FORY=9TO13STEP4:FORI=30TO37:SET(I,Y,C):NEXTI,Y
30 FORI=36TO41:SET(I,15,C):NEXT:FORI=40TO49:SET(I,9,C):NEXT:FORI=48TO53:SET(I,15,C):NEXT:FORY=9TO13STEP4:FORI=52TO60:SET(I,Y,C):NEXTI,Y
31 FORI=9TO12:SET(6,I,C):SET(7,I,C):NEXT:FORI=12TO15:SET(13,I,C):SET(14,I,C):NEXT
32 FORG=0TO18STEP18:FORY=18TO30+WW STEP4:FORI=9TO15:SET(Y+G,I,C):SET(Y+1+G,I,C):NEXTI,Y:WW=WW+4:NEXTG
33 FORI=9TO12:SET(59,I,C):SET(60,I,C):NEXT
34 PAINT(2,134),1,2
35 COLOR3,2:FORI=138TO168STEP2:LINE(0,I)-(256,I),PSET:NEXT
36 C=3:FORG=0TO17STEP17:FORI=0TO10:SET(I+G,17,C):NEXTI,G
37 FORI=9TO18:SET(I,23,C):NEXT
38 FORG=17TO20STEP3:FORY=0TO11STEP11:FORI=21TO29:SET(I+Y,G,C):NEXTI,Y,G
39 FORI=28TO31:SET(I,23,C):NEXT:FORI=38TO51:SET(I,23,C):NEXT
40 FORI=43TO51:SET(I,20,C):NEXT:FORI=43TO63:SET(I,17,C):NEXT
41 FORI=9TO21STEP4:FORY=17TO23:SET(I,Y,C):SET(I+1,Y,C):NEXTI,Y
42 FORG=28TO32STEP4:FORI=17TO23:SET(G,I,C):SET(G+1,I,C):NEXTI,G
43 FORG=39TO43STEP4:FORI=17TO20:SET(G,I,C):SET(G+1,I,C):NEXTI,G
44 FORG=37TO50STEP13:FORI=20TO23:SET(G,I,C):SET(G+1,I,C):NEXTI,G
45 FORI=1TO8:READK:POKE1335+I,K:NEXTI:FORI=1TO5:PLAY"V3103L25GB02AC":NEXTI
46 DATA0,3,41,32,49,57,56,50
47 FORI=0TO248STEP4:LINE(I,192)-(I+6,192-RND(25)),PRESET:NEXT:COLOR3,4
48 FORI=6TO256STEP2:LINE(I,192)-(I-6,192-RND(9)),PRESET:NEXT
49 FORI=0TO248STEP4:LINE(I,192)-(I+6,192-RND(25)),PRESET:NEXT:COLOR3,4

```

```

50 FORI=6TO256STEP2:LINE(I,192)-(I-6,192-RND(9)),PRESET:NEXT
51 DRAW"S6BM232,180C1FRNR8FNR6FR4EREREU2HUH3LNF4HL2F8L12"
52 FORI=1TO150:PSET(RND(256),RND(50)+140,RND(3)+1):NEXT
53 CT$="C3U50C4NU14HU12EC3U4RD4C4ND14FD12GC3D50":DRAW"S6BM4,136"+CT$+"BE6"+CT$+"BE6"+CT$:DRAW"BM240,140"+CT$+"BF4BR2"+CT$
54 DRAW"S20BM4,136C2U2HU17D17FU3EU14D14GD5R2U4EU15D15GD4R2U4ENU17":W$="U4NE3NH3":DRAW"S8BM10,123C2"+W$+W$+W$+W$+W$+W$
55 DRAW"S2BM170,40C3"+M$:GET(160,32)-(186,56),M,G:COLOR1,1:LINE(160,32)-(186,56),PRESET,BF:COLOR4,1:SCREEN1,1
56 BB=RND(8):L=140+(BB*8):CIRCLE(L,134),3,3,.9,.5,1:CIRCLE(L,134),3,1,.9,.5,1
57 IFMS=0THEN58ELSE59
58 P=RND(50):IFP>49THENMS=1
59 IFPEEK(339)=255THEN63
60 COLOR4,1:V=INT((JOYSTK(0)+1)/8):LINE(118,118)-(140+(V*8),133),PSET:PLAY"V3101L155BC":LINE-(118,118),PRESET
61 IF V=BB THEN62ELSE63
62 SCREEN1,0:PLAY"02L100G01L5BD":WB=WB+1:SCREEN1,1
63 IFMS=0THEN56
64 PUT(200-Q,30+Q)-(226-Q,54+Q),M,PSET:Q=Q+4:IFQ<80THEN56
65 LINE(200-Q+8,30+Q-8)-(226-Q+8,54+Q-8),PRESET,BF:Q=0:MS=0:FORF=1TO3:Pmode4,1:SCREEN1,1:PLAY"04L25GCG":Pmode3,1:SCREEN1,1:NEXTF
66 ML=ML+1:IFML=5THEN67ELSE56
67 PRINT064," PRESS FIRE BUTTON FOR NEW GAME":PRINT0448," YOUR FROG NABBED";WB;"WATERBUGS"
68 IFPEEK(339)=255THEN68
69 ML=0:WB=0:S=0:SCREEN1,1:GOTO56
70 REM 'SWAMP WARS' BY FRED B. SCERBO, ROBERT DOBBERT & DALE 'SNAIL' HAGGERTY, COPYRIGHT (C) 1982, IMB, ILLUSTRATED MEMORY BANKS, P.O. BOX 289, WILLIAMSTOWN, MA. 01267-0289

```

TRS-80*-CC USERS
INVENTORY CONTROL 1

At last, a Disk Based Inventory Control Program for the C.C.. Features include: Automatic warning when stock gets to reorder point, sorting of inventory by stock number. Lists stock number, description, amount in stock, cost and retail of item, gross profit %, total cost and total retail, grand total of total cost, grand total of total retail. All this plus many other unique features. We do custom programming for Model 2,3 and Color Computer! Let us know what you need and maybe we can help.

Program and Documentation only \$49.95, allow 3-4 weeks for delivery.
Send check or money order to: Teague Programming and Consulting
*TRS-80 Trademark of P.O. Box 728
Tandy Corp. Paducah, Kentucky 42001

LOOK!

One Of The Best Games Ever Created
For The Color Computer Has Been
Unleashed!!!

SKY-DEFENSE

Fly Over Mountains And Terrain
In Real-Time Flight And Battle
The Attacking Aliens. Machine
Language, Not Basic.

\$22.95

Quasar Animations

1520 Pacific Beach Dr.

San Diego, California

92109

AUTO RUN WILL GIVE THAT PRO LOOK

Several months ago, the RAINBOW carried a letter to the editor asking whether there was any sort of "bootstrap" program available for the 80C -- a program that would, in effect, "start things up" for a program.

Yes, Virginia, there is AUTO RUN and, in a word, it is good!

Available from Sugar Software (2153 Leah Lane, Reynoldsburg, OH, 43068, for \$14.95), AUTO RUN will load up your programs automatically. No more "CLOAD" and then "RUN." In effect, it duplicates the RUN command in Disk Color Basic, in which you can load a program and tell it to start running at the same time.

This, of itself, would be a fine addition to a software library, and it would be very handy to append AUTO RUN to every program you have. But, there is more.

The program also allows you to draw low res graphic screens with title cards for your programs. You can use all the colors and even create extremely nifty borders automatically! You can, of course, easily mix text and graphics on the screen.

Using this option, you can issue one CLOAD command, have your title

graphics come on automatically, and then have your program load and run. No other buttons to press.

And, of note to software authors, the price of AUTO RUN includes the right to use it with any program you write for sale. That, frankly, is generous.

An outstanding offering.

Software Review...

LOW-RES BIORHYTHM IS COLORFUL

Biorhythms fascinate a lot of people and here is an inexpensive, graphic version of this program which will display a two-week chart on your 80C screen.

Its for the 16K Extended Color version and is available from Color Software Services (P.O. Box 1723, Greenville, TX, 75401, for \$7.95).

You simply enter your birthdate and the date you want the chart to start into the 80C. The computer then draws a chart with low-res color blocks for the three cycles -- physical, emotional and intellectual. If the colors overlap, then more than one cycle is present for that particular day.

This version of a popular program isn't as fancy as those which print out on a printer, but it is less expensive and doesn't require anything else to get the full report. If you have a passing interest in biorhythms -- or don't have or want to use a printer -- this version will be more than adequate for your needs.

We found it easy and enjoyable.

PROGRAMS FOR KIDS

CIRCUS ADVENTURE-16K

A children's adventure game with many graphics, songs, and surprises. Great family fun for all ages. - \$10.00



NAME THAT SONG GAMES



I. This program contains 72 children's songs to entertain everyone. 2 levels of difficulty. Timer. Hours of fun.
II. This version contains 72 all time popular hits. Pop, country, and movie melodies from the last three decades.
III. This adult version has 60 Broadway Show tunes which challenge lovers of past musicals. Fun for all trivia buffs
16K- EXT. \$10.00 EACH

READING 2-PAK 4K \$10.00

Creative poetry and reading aids.



FREE SURPRISE PROGRAM ON TAPE WITH ORDERS OF \$20.00 OR MORE!

COMPUTER ISLAND

DEPT. R., 227 HAMPTON GREEN, STATEN ISLAND, N.Y. 10312
(other tapes available)



Now! THE MOST COMPLETE LIST OF EDUCATIONAL TRS-80 COLOR COMPUTER™ PROGRAMS IN THE UNITED STATES

Only **\$4.00** per cassette

A partial list —

- Add
 - Algebra
 - Alphabet
 - Planetary Positions
 - Flash cards for German, French, Spanish, States and Capitals
 - Featuring — Computerized Encyclopedia 48 cassettes (\$200 with case)
 - Biology
 - Weather Forecaster
 - Physics
- Vol. 1 - \$4

Many more! From Kindergarten through graduate courses. All cassettes \$4.00 each. Write for free list. Visa and Mastercharge accepted

MOSES ENGINEERING COMPANY

Dept. R Route 7, Regent Drive
Greenville, S.C. 29609
(803) 834-7974

TRIS-80[®] BASIC
LEVEL II SYSTEM REFERENCE CARD
MODEL I

TRIS-80[®] BASIC AND ASSEMBLER
LEVEL II SYSTEM REFERENCE CARD
MODEL I

TRIS-80[®] BASIC AND ASSEMBLER
LEVEL II SYSTEM REFERENCE CARD
MODEL III

TRIS-80[®] BASIC
LEVEL II SYSTEM REFERENCE CARD
MODEL I

TRIS-80[®] BASIC AND ASSEMBLER
LEVEL II SYSTEM REFERENCE CARD
MODEL I

TRIS-80[®] BASIC AND ASSEMBLER
LEVEL II SYSTEM REFERENCE CARD
MODEL III

TRIS-80[®] BASIC AND ASSEMBLER
MODEL II SYSTEM REFERENCE CARD
TRIS-80[®] BASIC AND EXTENDED

TRIS-80[®] BASIC POCKET COMPUTER
SYSTEM REFERENCE CARD

APPLE II & II PLUS
REFERENCE CARD FOR THE
WITH DOS COMMANDS AND MESSAGES
MICROCOMPUTER

APPLE II & II PLUS
REFERENCE CARD FOR THE
WITH DOS COMMANDS AND MESSAGES
MICROCOMPUTER

SAVE TIME! AT LAST! THROW AWAY THE BOOK! Handy-Dandy QUICK REFERENCE!

Each card is a complete summary of the reference manuals and the microcomputer. Cards are two or more colors, printed on 80 pound Beckett Antique cover stock or a comparable stock, stretch-wrapped in plastic for shipping. They are accordion-foldup cards, in the same style as the traditional IBM reference cards used on the major computers for years. Fold-up size is eight and one-half by three and three-quarter inches, so they will fit easily into the shirt pocket. These cards provide a complete summary of the manuals plus many extras at your fingertips.

MODEL I	MODEL II	MODEL III	COLOR	APPLE II & II PLUS
BASIC: Buff & Blue 5 Panels, 10 Pages (For the Classroom) Memory Map. Easy Graphics. Basic Statements. Basic Functions. Basic Facts. Special Characters. Basic Commands. Edit Subcommands. PRINT USING Examples. Messages & Codes. Reserved Words. Special Keys. ASCII Character Chart. With Space Compression Codes. Control Codes. Basic Internal Codes. Hex/Dec Conversion Chart. Screen Line Layout. BASIC & ASSEMBLER: Buff & Blue 8 Panels, 16 Pages (For the Pro) Complete 200 Instructions. Assembler Instructions, Commands, Operators. Editor/Assembler Commands, and Edit Subcommands. Flags, Conditions, & Chart. Internal Routines. Assembler Error Msgs. Plus all items in the Basic Card, except Internal Codes.	BASIC & ASSEMBLER: Green 10 Panels, 20 Pages (For the Business) Small Memory Map. Screen Layout. Easy Graphics. Complete 200 Instructions. Series-I Assembler Instr. Commands, Operators, and Edit Subcommands. Assembler Error Msgs. Power-up Error Msgs. Wild Cards, DOS Messages. SVC Procedure Panel. Host Logon Panel. Version 2.0 Lib. Command Formats and System Utility Formats. Basic Functions & Statements. DOS File Naming Convention. Basic Commands & Edit Subcommands. Special Keys. Basic Internal Codes and Reserved Words. Basic Msgs & Codes. PRINT USING Examples. Special Characters. "DO" Utilities & BASIC Command. ASCII Character Chart with SVC Names and Numbers. Control Codes.	BASIC: Blue & Buff 6 Panels, 12 Pages (For the Classroom) All Color Graphics. Kana Characters. Euro-Characters. Memory Map. Special Keyboard Functions. ASCII Char Chart w/Space Compression Codes. Control Codes. Cassette Loading Err Msgs. Basic Commands, Edit Subcommands, Special Chars, Basic Statements, Facts, Functions. Derived Functions, Special Operations (POKEs). PRINT USING Examples. Basic Msgs & Codes. Basic Internal Codes. Reserved Words. Screen Line Layout. BASIC & ASSEMBLER: Blue 10 Panels, 20 Pages (For the Pro) Complete 200 Instructions. Assembler Instructions, Commands, Operators. Series I Editor/Assembler Commands & Edit Subcommands. Flags, Conditions, & Chart. Hex/Dec Conversion Chart. Assembler Error Msgs. Internal CALL Routines. Break Processing Procedure. Plus all items in the Basic card.	BASIC & EXTENDED: Grey & 9 Colors. 8 Panels, 16 Pages (For the Artist) All Color Graphics. System Commands. PRINT USING Examples. Special Characters. Special Keys. Cassette Loading Err Msgs. Basic Functions & Statements. Playing Music, Making a Circle, and Drawing Panels. Derived Functions. Messages & Codes. Musical Notes, by Octave, in Color, Including Rests and Time. Memory Map. Reserved Words. Internal Codes. ASCII Char Codes Chart. Including Inverse Graphics and Color Graphics. Control Codes. Color Group Chart. Phone Information Summary. Screen Line Layout. Extended Graphics Pmode Illustrations.	BASIC: Red & Pink 7 Panels, 14 Pages (For the Classroom) 48K Memory Map APPLESOFT and INTEGER BASIC Basic Statements. Basic Functions. Derived Functions. Special Characters & Operators System & Utility Commands. Pokes/Peeks, Calls Monitor Commands Key & Control Functions APPLESOFT Internal Codes APPLESOFT Reserved Words Integer Basic Addressing DOS 3.3 Command Summary Color Selection Chart Error Msgs & Handling Reading Machine Language Hex/Dec Conversion Chart ASCII, Print, Video, 6502, Integer and APPLESOFT Code Reference Card, 0-255 BASIC & 6502: Red 8 Panels, 16 Pages (For the Pro) All features of the Basic Card, Plus: 6502 Timing 6502 Language Simplified Flags & Conditions with Reference Chart.

POCKET

BASIC: Purple
5 panels, 10 pages
Operating Characteristics
Memory Types and Limitations.
Modes of Operation
PRIO Mode
RUN Mode
RESERVE Mode
DEF Mode
Fixed Variable Facts and References
System Function Keys
Math and Logic Function Keys
Normal Character Keys
Special Characters and Function Keys
Basic Commands
Cassette Interface Commands
Reserved Words
Math and Numeric Functions
Derived Functions
Basic Statements
Error Messages and Codes
USING Statement Examples
and more....

RETAIL ORDER Send Check or Money Order

Wholesale C.O.D. Plus shipping & handling charges.

Please send me:	Card	Retail	Educational Institutions	Wholesale (over 24)	Wholesale (over 99)
() Copies of MODEL I BASIC & ASSEMBLER		\$4.95	\$3.96	\$2.75	\$2.50
() Copies of MODEL I BASIC-ONLY		2.95	2.36	1.62	1.48
() Copies of MODEL II BASIC & ASSEMBLER		5.95	4.76	3.27	2.98
() Copies of MODEL III BASIC & ASSEMBLER		5.95	4.76	3.27	2.98
() Copies of MODEL III BASIC-ONLY		3.95	3.16	2.17	1.98
() Copies of COLOR BASIC AND EXTENDED		4.95	3.96	2.75	2.50
() Copies of POCKET BASIC		2.95	2.36	1.62	1.48
() Copies of APPLE II & II PLUS BASIC		3.95	3.16	2.17	1.98
() Copies of APPLE II & II PLUS BASIC & 6502		4.95	3.96	2.75	2.50

Your P.O. Number _____ Date _____

NAME: _____

ADDRESS: _____

CITY _____ STATE _____ ZIP _____

Indiana Residents Add 4 Percent for Indiana Sales Tax

Send to:

NANOS SYSTEMS CORP.
P.O. BOX 24344
SPEEDWAY, IN 46224
(317) 244-4078

It's about Time!

• TRIS-80 is a Registered Trademark of Tandy Corp.
APPLE is a Reg. TM of APPLE COMPUTER, INC.
Coming Soon: Pet, Z80, Atari, ZX80, ZX81, Heath

Review...

PAPER PORTER IS HELPFUL FOR PRINTER

Want to use single sheets of paper in your printer without paying the extra expense of a friction feed? Then **PAPER PORTER** (from Minit-Man Printing of Otsego, MI, 49078) is just what you are looking for! It's a sheet of mylar with tractor feed perforations on the sides and a mylar strip near the top (called the "holding clamp"). The holding clamp is attached on one side and forms a flap into which the top of the paper is slid and held in place by friction. The Heathkit store where I bought my Epson MX-80 printer had a stack of them on sale for only \$4.50 each, so I figured that at that price it was worth at least trying out. It works great!

Use of the **PAPER PORTER** is quite simple. First, you slip the top of the page under the paper clamp, then adjust it so that the left side of the paper is at the right side of the green stripe which is the left margin of the **PAPER PORTER** (this stripe is called the "vertical strip"). Then you slide the **PAPER PORTER** into your printer. You may have to adjust the width between the tractors, since the holes are not the same distance apart as the holes on the printer paper I bought from Radio Shack. Then you

adjust the roller knob to get the paper set where you want printing to begin. That's all there is to it!

There are two minor problems, each of which is easily solved with just a little bit of ingenuity. The first problem is that ordinary 8.5x11 inch paper will trigger the "paper-out" condition on the printer long before the bottom of the page is reached. This is overcome by using legal-size paper (8.5x14 inch) and trimming the paper to 8.5x11 inch size if that size is really needed. The second problem is that sometimes the paper will come out of the holding clamp. This is solved with a short strip of scotch tape, which sticks to the Mylar and which easily come off of the paper to free it from the **PAPER PORTER** when printing is completed.

The **PAPER PORTER** requires a minimum head clearance of .016".

--Dr. David R. Barr

Look for
the...



™ TRS80 color

From the January 1981 issue of the CSRA Computer Club newsletter:

There was some amusement at the November meeting when the Radio Shack representatives stated that the software in the ROM cartridges could not be copied. This month's 68 Micro Journal reported they had disassembled the programs on ROM by covering some of the connector pins with tape. They promise details next month. Never tell a hobbyist something can't be done! This magazine seems to be the only source so far of technical information on the TRS-80 color computer. Devoted to SS-50 6800 and 6809 machines up to now, 68 Micro Journal plans to include the TRS-80 6809 unit in future issues.

NOTE: This and other interesting and needed articles for the Radio Shack TRS-80 color computer™ are being included monthly in 68 Micro Journal—The Largest specialty computer magazine in the world!

68 MICRO JOURNAL

5900 Cassandra Smith Road
Hixson, Tennessee 37343
615 842-4600

Subscription Rates

USA: 1-year \$24.50; 2-year \$42.50; 3-year \$64.50
CANADA and MEXICO: Add \$5.50 per year to USA Price
Foreign Surface: Add \$12.00 per year to USA Price
Foreign AIRMAIL: Add \$36.00 per year to USA Price

** Sample issue - \$3.50



68 Micro Journal™ was established with one objective in mind; to provide a Magazine FOR 68xx Users BY 68xx Users. Because of a strict advertiser policy, 68 Micro Journal™ has gained a strong following WORLDWIDE because the reader KNOWS what he is getting when purchasing from a 68 Micro Journal™ Advertiser. It has gained a strong User following because most of the material published is contributed BY USERS, and, therefore, is relevant to the Users needs.

Currently, and even before the Color Computer™ hit the stores, 68 Micro Journal™ was devoting more space to the TRS-80C Color Computer™ and information concerning the Motorola 6809 (which is the CPU in the Color Computer™) than ANY OTHER Computer Magazine. Examples include:

REVIEWS of the three major Disk Control Systems for the Color Computer™, most of the Monitors, Assemblers, and Disassemblers, Word Processors and Editors, "Terminal" Programs (for use with Modems, Communications with other Computers, etc.), and of course, Games.

HINTS for Expanding Memory, Power Supply Cooling, repairing sticky keyboards, disabling the ROM PAK "Take Over", hooking up to Printers, etc.

DISCUSSIONS of the 6883 Synchronous Address Multiplexer, using the Color Computer™ with 64K and 96K memory (which it is ALREADY capable of handling), thoughts on Programming, etc.

I suggest that you subscribe to 68 Micro Journal™, SOON, as many back issues are sold-out.

We still, and will continue to, lead in the type information you need to FULLY UTILIZE the POWER of the 6809 in the Radio Shack TRS-80 Color Computer™.

Bob Nay
Bob Nay
Color Computer Editor

THE ULTIMATE IN COLOR COMPUTING

WORD PROCESSING

THE SUPER "COLOR" WRITER II

The Word Processor that re-wrote the book on Word Processing

The **Super "Color" Writer** is a FAST, machine code, full featured, character (screen) oriented word processing system for the TRS-80(TM) Color Computer and ANY printer. The video display is styled after a professional phosphor (green characters on black background) display for hours of use without eye fatigue (optional orange on black). The unique print WINDOW frees you from 32, 51 or 64 character lines FOREVER! This window can be moved anywhere in the text file, up, down, left or right to display the text as it will be printed without wasting paper. You can create or edit **Super "Color" Terminal** files, ASCII files, BASIC programs or Editor/Assembler source listings. It's simple enough for beginners with 4K and...for the professional writer with a 32K disk system and a lot to say, there's plenty of room to say it!

COMPARISON CHART	SUPER COLOR WRITER			THE COMPETITION		
System Size	4K	16K	32K	4K	16K	32K
TAPE Text space	N/A	8K	24K	N/A	2K	18K
ROMPAK Text space	2.5K	15K	31K	N/A	N/A	N/A
DISK Text space	N/A	6.5K	22.5K	N/A	0.5K	16.5K
Right Justify	YES			NO		
Video Window	YES			NO		
Edit any ASCII File	YES			NO		

The figures speak for themselves and with professional features like PROGRAMMABLE function string commands to perform up to 28 commands automatically, PROGRAMMABLE text file chaining, PROGRAMMABLE column insert & delete, and right hand JUSTIFICATION with punctuation precedence, the choice is clear but there's still more!

The **Super "Color" Writer** takes full advantage of the new breed of "smart printers" with Control codes 1-31, 20 Programmable control codes 0-255 for special needs and built in Epson MX-80, Centronics 737, 739 and R.S. Line Printer IV, VII, VIII drivers.

CHECK THESE FEATURES!!

HIGH SPEED & normal operations • 32K Compatible • Window • Key beep • HELP table • 128 character ASCII & graphics • Memory left • Lower case • Full cursor control • Quick paging • Scrolling • Word wrap around • Tabs • Repeat all functions • Repeat last command • Insert character & line • Delete character, delete to end of line, line to cursor, line & block • Block move, copy & delete • Global Search, Exchange & Delete • Merge or Append files • Imbed Control Codes in text • Underline • Superscripts • Subscripts • Headers, Footers & 2 Auxiliary footnotes on odd, even or all pages definable position • Flush right • Non-breakable space • 4 centering modes: 5, 8, 3, 10 & 16.7 (CPI) • Full page & print formatting in text • Single sheet pause • Set Page length • Line length, Line spacing, Margins, page numbers • Title pages • Printer baud: 110, 300, 600, 1200, 2400 • Linefeeds after CR • Soft & hard formfeed • Works with 8 bit printer fix • and more!

SUPER "COLOR" WRITER DISK

The Disk version of the **Super "Color" Writer** works with the TRS-80C Disk System and has all the features listed above plus many more! Use with up to four Disk Drives. Includes an extended HELP table you can access at any time. Call a directory, print FREE space, Kill disk files and SAVE and LOAD text files you've created all from the **Super "Color" Writer**. Print, merge or append any **Super "Color" Terminal** file, ASCII file, BASIC program or Editor/Assembler source listing stored on the Disk or tape. The **Super "Color" Writer Disk** version has additional formatting and print features for more control over your printer and PROGRAMMABLE chaining of disk files for "hands off" operation. Print an entire BOOK without ever touching a thing!

Includes comprehensive operators manual.

TAPE \$49.95 ROM PAK \$74.95 DISK \$99.95
Manual only, \$7.00 Refundable with purchase.

Allow 2 extra weeks for personal checks. C.O.D. orders add \$2.00. When ordering specify computer type and add \$2.00 for S/H. Minn. residents add 5% sales tax. VISA/Master Chg.

DEALER INQUIRES ARE INVITED.

TRS-80 is a registered trademark of the Tandy Corp.

COMMUNICATIONS

THE SUPER "COLOR" TERMINAL

Time Share, Smart Terminal, High-speed Data X'fer & Videotex

The **Super "Color" Terminal** turns the Color Computer into a Super-smart terminal with all the features of VIDEOTEX(TM) plus much more. COMMUNICATE with Dow Jones & Compuserve and with computers like the TRS-80(TM) MODEL I, II, III, APPLE etc. via modem or RS-232 direct. Save the data to tape or print it! Reduces ON-LINE cost to a minimum!

FEATURES

10 buffer size settings from 2-30K • Buffer full indicator • Prints buffer contents • Full 128 ASCII keyboard • Compatible with **Super "Color" Writer** files • UPLOAD & DOWNLOAD ASCII files, Machine Language & Basic programs • Set RS-232 parameters • Duplex, Half Full • Baud Rate: 110, 300, 600, 1200, 2400, 4800 • Word Lengths: 5, 6, 7 or 8 • Parity: Odd, Even or None • Stop Bits: 1-9 • Local linefeeds to screen • Tape save & load for ASCII files, Machine code & Basic programs • Unique clone feature for copying any tape.

Super "Color" Terminal Disk

The Disk version offers all the features listed above plus Host ability in full duplex • Lower case masking • 10 Keystroke Multiplier (MACRO) buffers on disk to perform repetitive log-on tasks and send short messages (up to 255 bytes) • Programmable prompts for send next line • Selectable character trapping • Set printer line length • Pagination • Linefeed with CR option • Printer Baud: 110, 300, 600, 1200 & 2400 • Documentation.

TAPE \$39.95 ROM PAK \$49.95 DISK \$69.95
Documentation only, \$4.00 Refundable with purchase.

16K RAM KIT \$15.99

PREMIUM 16K 200 Ns Ram for TRS-80 Color Computer. Includes ram test instructions and a ONE YEAR GUARANTEE. 32K upgrade instructions FREE! (32K requires soldering).

ROMPAK KITS

Put your programs in a ROMPAK or execute tape based programs in a RAMPACK at \$COOO. Kit includes 1 socketed P.C. board that holds up to 4 2716 EPROMs or 4 2K Static Ram Chips for a total of 8K and a plastic housing to fit the rom port. \$24.95

2716 2K 5v EPROM \$5.95 ea. 2K Static RAM \$19.95 ea.

COLOR GAMES!!

FEATURING GREAT GRAPHICS & SOUND!

ADVENTURE 3-PAK Requires 16K Extended Basic TAPE \$24.95

This TRILOGY OF 3-D FANTASY GAMES takes you to the WORLD UNDER THE CIMEEON MOON. Engage in ritual combat with Toodmoath, Narthokic Monsters and skilled warriors. Advance in rank with play experience. Then adventure through DAZMAR'S UNDERWORLD OF DOOM to the forbidden ruins of Castle Argann. Search for the Eye of Dazmar while avoiding the sorcerer's intricate traps. Survivors must then negotiate the perilous peaks of the Ugrek Mountains to the FORSAKEN GULCH where the wicked idol awaits restoration.

VEGAS 5-PAK Requires 16K Extended Basic TAPE \$19.95

The THRILLS OF A VEGAS CASINO at home. Five action packed Vegas games for up to four players. CASINO CRAPS • 21 • ONE ARMED BANDIT • UP & DOWN THE RIVER • KENO. Bank tracks players' winnings from game to game • realistic cards • regulation tables • boards • authentic sounds • lively graphics • official rules in each game.

COMBAT 3-PAK Requires 16K Extended Basic TAPE \$24.95

Three action packed two player games featuring lifelike graphics and sound of LASER FIRE, CANNONS and PHOTON TORPEDOES.

2-1-0 TANK COMBAT five terrains • the experienced arcade player can design combat scenario. STELLAR BATTLE pilot a Flex-Wing Fighter at incredible speeds in enemy space taking out Dorian Eye Fighters defending the Imperial Star Fortress. GALACTIC BLOCKADE maneuver your craft in a course that boxes your opponent but avoid cosmic debris and hostile space probes!



NELSON
SOFTWARE
SYSTEMS



P.O. Box 19096 Minneapolis, MN 55419 612/827-4703



SAVE 10%



COLOR COMPUTER

This Month Only

MASTER CONTROL

Copyright ©1981 Soft Sector Marketing, Inc.
- Written by A. Schwartz

Requires 16-32K

1. 50 preprogrammed command keys. Standard and Extended command.
2. Direct control of motor, trace, and audio from keyboard.
3. Automatic line numbering.
4. Programmable Custom Key.
5. Direct Run Button.
6. Keyboard overlay for easy program use.
7. Easy entry of entire commands into computer.

Load Master Control into your machine then either type in a BASIC program or load one in from tape to edit. Cuts programming time by 50% or more.

\$24.95



For The Radio Shack
Color Computer*

COLOR BONANZA

some 4K
some 16K
some 32K

Written by E.R.I.

50 PROGRAMS In One Package

*The Color Computer is a product of Radio Shack,
division of the Tandy Corporation.

\$49.95

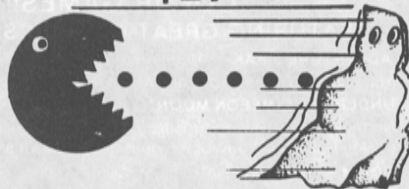


GHOST GOBBLER

16K - JOYSTICK

\$21.95

Superior to
PACKET MAN &
PAC ATTACK



MACHINE LANGUAGE

FOR 4K COLOR USERS

Color Scarfman



GREAT GRAPHICS
Machine Language

Only **\$19.95**

Tape Directory

Copyright ©1982



Creates index
of your
programs
for each
tape.
To screen
or printer.

A MUST FOR ALL
COLOR COMPUTER
USERS!



Cassette, **\$14.95**

- DEALER INQUIRIES WELCOME -

SSM SOFT SECTOR MARKETING,
INCORPORATED

6250 Middlebelt • Garden City, Michigan 48135
Order Line **800-521-6504**
Michigan Orders & Questions 313-425-4020



PAYMENT-payment accepted by charge, personal check, or C.O.D. only, under the following conditions: **Charges** processed when shipped, usually within 48 hours. **Personal Checks** delay shipping, pending 3 weeks to clear. **C.O.D.** orders are cashed check or cash only, add \$1.50. MI residents must add 4% sales tax.

SHIPPING & HANDLING - Shipping Charges: Send the larger amount, 2% or \$2.50, unless stipulated otherwise. Any order received without shipping and handling will be shipped freight collect. **Air Mail Shipping** outside of North America, please send the larger amount, 10% or \$10.00. Overpayment will be refunded.

The Quality Continues...

Utility...

A DATA FILE TO STORE ALL YOUR INFORMATIONBy Jorge Mir
Rainbow Utilityman

This month's utility is called **UNIDATFL**, and, as the name infers, it is a very flexible data file system which can be used to store information in any kind of format chosen by the user.

The program begins with a menu at which you can choose to add data, search for it, print it or even sort it.

When data is to be added, the program asks whether the information is to be stored on a cassette or disk file or if it is to be entered from the keyboard.

If you want to add data from a cassette file, the program asks for the file name. At this time you should have the cassette recorder ready, meaning with the play button depressed and a clean tape wound past the leader. This is necessary because after the file name is entered, the program will begin to search for and load the named file.

If the file you want loaded is stored on a disk, you should have the disk in the disk drive. After you indicate the file is on the disk, the program will search the disk directory and print all file names with a "DAT" extension to aid you in the proper identification of the file to be loaded.

New data is entered by indicating you want to use the keyboard. The program searches for the first available memory space so it can store new data input from the keyboard. Data can be added at any time, whether or not a file has already been loaded into memory.

The information should be typed in the same format you wish to see it when searching for it. The <ENTER> key should be pressed at the end of each line. Once all data for a specific item is entered, you indicate so by typing an up arrow. You are then given a chance to edit any portion of the data before processing.

The editing is done by typing in the data you want to delete and adding the corrected data.

An up arrow is also used to exit from the keyboard input routine and to return to the main menu.

Once data is loaded into memory, you can search for it by indicating any keyword(s) contained in the specific data information to be searched and displayed on the screen. Please note that if the same keyword is contained in other stored data,

that data will also be printed on the screen.

After the selected item is printed on the screen, you are given some choices: You can add additional data to the item, edit any portion of the item, output it to a printer, or delete it from the file. You also have the choice of returning to the main menu or continuing to search for additional data containing the same keyword(s). The program indicates when you reach the end of the file and then returns to the main menu.

If you choose the print routine from the main menu, all data contained in the file is sent to a printer. You can stop the printer at any time by typing an "S". The program checks to see whether your printer is ready before it proceeds. If the printer is not ready, a message is printed to indicate you need to take action -- usually turn it on or to place the "on line" switch to on.

The stored data can also be sorted alphabetically by choosing the sort routine from the main menu. You should note that items are stored as a continuous string, so the sort routine sorts the entire string alphabetically. If any item has more than 255 characters, the excess characters are stored in the following memory space. However, the sort routine does not work properly in such instances, since the second memory location is interpreted by the program as a separate item and sorted accordingly. While the file is being sorted, the number of passes -- or times the program goes through the file -- is indicated. This step was added because, at times when a large amount of data must be sorted, a sort takes some time. This will allow the user to know that processing is, indeed, taking place.

Once you are through working with a file, you can exit the program. Before it ends, **UNIDATFL** asks whether you wish to save your information. If you choose to do so, the program then asks whether you want data daved to tape or disk and requests you to type in a file name under which you wish to store the data. If the program is to be stored to disk, the program checks to see whether there is already a file by that name on the disk. If there is one, it **KILLS** it before storing the file contained in memory.

(Continued on next page)

UNIDATFL is very flexible and can be used as a data bank for names and addresses, recipies, collection lists (coins, stamps, etcetera), tax data, checks, "to-do" lists and the like. In fact, there are practically no limitations as to the type of data it can handle in an efficient manner. The amount of data which can be stored is limited, of course, by the memory of your computer.

```
1 GOTO 4000
2 DATA BD,B3,ED,1F,02,7E,96,A7
10 '      **** DATAFILE ****
20 '      BY: JORGE MIR
30 '
40 '      CHANGE STEP 60 ACCORDING
      TO RAM SPACE AVAILABLE
50 '
51 FOR I=0TO7:READE$:NEXT:FORI=0
TO18:READE$
52 E=VAL("&H"+E$):POKEI+&HE02,E:
NEXT
53 DATA 8E,04,00,A6,80,81,60,2D,
04,80,40,A7,1F,8C,06,00,2D,F1,39
54 DEFUSR0=&HE02
60 CLEAR 18000:D=500:DIM N$(D)
70 GOSUB 3500
100 GOSUB 5000
105 I$=INKEY$:IF I$=""THEN105
110 IF I$="A" THEN 290
120 IF I$="F" THEN 530
130 IF I$="P" THEN 1530
140 IF I$="S" THEN 1760
150 IF I$="E" THEN 990
160 SOUND 100,2:GOTO 105
290 GOSUB3000:X=0
310 IF TY=1 OR TY=-1 THEN 860
320 CLS:PRINT"(TYPE '^' WHEN DON
E OR TO EXIT)":PRINT STRING$(32,
"-")
330 X=X+1:IF N$(X)="" THEN 340 E
LSE 330
340 N=1
350 LINE INPUT I$:IF I$<>"^" THE
N 380
360 IF F=0 THEN 480
370 GOTO 70
380 N=N+1
```

16K
ECB



```
390 IF LEN(N$(X))+LEN(I$)>250 T
HEN 410
400 N$(X)=N$(X)+CHR$(13)+I$:GOTO
350
410 N$(X)=N$(X)+"*"
420 IF N$(X+1)=""THEN470
430 Y=X
440 Y=Y+1:IF N$(Y)<>" "THEN440
450 N$(Y)=N$(Y-1):Y=Y-1
460 IF Y=X THEN 470 ELSE 450
470 X=X+1:N$(X)=CHR$(13)+I$:GOTO
350
480 IF N=1 THEN 70
490 PRINT"IS ABOVE DATA CORRECT
(Y/N)?:GOSUB 1150
500 IF I$<>"N" THEN 320
510 GOSUB 1410
520 GOTO 580
530 PRINT @384,"key word(s)";:X
=USR(0)
540 LINEINPUT K$
550 X=0:SOUND200,2:PRINT@490,"se
arching file";:Z=USR(0)
560 X=X+1:IF X=D+1 OR N$(X)="" T
HEN 780
570 IF INSTR(N$(X),K$)=0 THEN 56
0
580 SOUND150,1:CLS0:PRINT @480,"
functions: a c d s p ?";:Z=
USR(0)
590 PRINT @0,"";
600 N=INSTR(N$(X),"J"):IF N=0 GO
TO 620
610 MID$(N$(X),N,1)=CHR$(13):GOT
O 600
620 N=INSTR(N$(X),"*"):IF N=0 TH
EN 650
630 PRINT LEFT$(N$(X),X-1)
640 X=X+1:GOTO 620
650 PRINT N$(X)
660 IF I$<>"N" THEN 690
670 IF INKEY$="" THEN 670
680 PRINT:PRINT:GOTO 490
690 GOSUB 1150:F=0
700 IF I$="D" THEN 800
710 IF I$="S" THEN 70
720 IF I$="C" THEN F=1:GOSUB 141
0
```

(Continued on Page 61)

Peacock Ent.

1. CMAILIST (c)

What's a Phone Book, an Address Book, a Mail Label Generator and More? CMAILIST (c)! The mini-data-base for home or business. Price: \$19.95

2. PEACOCK UTILITY PAC (PUP)

PUP (c) is a Pac of 5 utility Programs for the Color Computer.

1. MERGE: auto-merge Programs.
2. CSAVEM: duplicate ML Programs.
3. DUAL: simultaneously Print to screen & Printer.
4. VIDPRINT: selectively dump videotex screens to your Printer.
5. AMORTIZE: it figures your loan and Prints repayment schedules.

Price for PUP: \$9.95. Both PUP & CMAILIST only \$23.95

CHECK OR MONEY ORDER (shipping Prepaid) COD (shipping added)

PEACOCK ENT. PHEASANT RUN BOX 494 RD#3 CANASTOTA, NY. 13032 315-697-7147

TELEWRITER

the Color Computer Word Processor

the only one with all these features for your TRS-80 Color:

51 column x 24 line screen display ■ Sophisticated full-screen editor
 Real lower case characters ■ Powerful text formatter
 Works with any printer ■ Special MX-80 driver
 Runs in 16K or 32K ■ Disk & cassette I/O

requires absolutely no hardware modifications

TELEWRITER

Telewriter is the powerful word processor designed specifically for the Color Computer. It can handle almost any serious writing job and it is extremely easy to use. It has all the advanced features you need to create, edit, store, format and print any kind of text. With Telewriter you can quickly produce perfect, finished copy for letters, reports, term papers, articles, technical documentation, stories, novels, screenplays, newsletters. It is also a flexible and efficient way to take notes or organize ideas and plans.

51 x 24 DISPLAY

The Color Computer is an incredibly powerful and versatile computer, but for text editing it has some major drawbacks. The small 32 character by 16 line screen format shows you too little of the text and, combined with its lack of lower case letters, bears little resemblance to the way text really looks on the page. Reverse video in place of lower case just adds confusion.

Telewriter eliminates these shortcomings with **no hardware modifications required**. By using software alone, Telewriter creates a new character set that has **real lower case letters**, and puts 24 lines of 51 characters on the screen. That's more on-screen characters than Apple II, Atari or TRS-80 Model III. That's more than double the Color Computer's standard display.

FULL SCREEN EDITOR

The Telewriter editor is designed for maximum ease of use. The commands are single key (or single key plus control key), fast, and easy to remember. There is no need to switch between insert modes and delete modes and cursor movement modes. You simply type. What you type is inserted into the text at the cursor, on the screen. What you see on the screen is always the current state of your text. You

can move quickly through the text with one key cursor movement in all 4 directions, or press the shift key simultaneously for fast, auto-repeat. You can jump to the top or bottom of the text, the beginning or end of a line, move forward or backward a page at a time, or scroll quickly up or down. When you type past the end of the line, the wordwrap feature moves you cleanly to the next.

... one of the best programs for the Color Computer I have seen ...

— Color Computer News, Jan. 1982

You can copy, move or delete any size block of text, search repeatedly for any pattern of characters, then instantly delete it or replace it with another. Telewriter gives you a tab key, tells you how much space you have left in memory, and warns you when the buffer is full.

FORMAT FEATURES

When it comes time to print out the finished manuscript, Telewriter lets you specify: left, right, top, and bottom margins; line spacing and lines per page. These parameters can be set before printing or they can be dynamically modified during printing with simple format codes in the text.

... truly a state of the art word processor ... outstanding in every respect.

— The RAINBOW, Jan. 1982

Telewriter will automatically number pages (if you want) and automatically center lines. It can chain print any number of text files from cassette or disk without user intervention. You can tell it to start a new page anywhere in the text, pause at the bottom of the page, and set the Baud rate to any value (so you can run your printer at top speed).

You can print all or any part of the text buffer, abort the printing at any point, and there is a "Typewriter" feature which allows you to type straight to your printer. Because Telewriter lets you output numeric control codes directly (either from the menu or during printing), it works with any printer. There's even a special driver for the Epson MX-80 that lets you simply select any of its 12 fonts and do underlining with a single underline character.

CASSETTE AND DISK I/O

Because Telewriter makes using cassette almost painless, you can still have a powerful word processor without the major additional cost of a disk. The advanced cassette handler will search in the forward direction till it finds the first valid file, so there's no need to keep retying a load command when you are lost in your tape. The Verify command checks your cassette saves to make sure they're good. You can save all or any part of the text buffer to disk or cassette and you can append pre-existing files from either medium to what you have in the buffer already.

AVAILABLE NOW

Telewriter turns your Color Computer into the lowest cost hi-power word processor in the world today. It runs in 16K or 32K (32K recommended) and is so simple you can be writing with it almost immediately. It comes with 63 pages of documentation and is fully supported by Cognitec. Telewriter costs \$49.95 including shipping (California residents add 6% tax). To order, specify disk or cassette and send check or money order to:

Cognitec
 704 Nob Ave.
 Del Mar, Ca. 92014

Or call (714) 755-1258 weekdays 7 AM-4PM PST. We will gladly answer your questions.

Apple II is a trademark of Apple Computer, Inc.; Atari is a trademark of Atari, Inc.; TRS-80 is a trademark of Tandy Corp.; MX-80 is a trademark of Epson America, Inc.





COLOR COMPUTER

**GAMES • Arcade Graphics
Strategy Adventure • Invaders
Pac Attack • Storm • Magikube
Cave Hunter • Berserk • Maze Race
Calixto Island • Black Sanctum**

**HOME & WORK • Checkbook • Finance
Word Processing • Color Data Organizer
3D Drawing Board • Mailing List**

**PROGRAMMER AIDS • PASCAL • Diagnostics
Editor • Assembler • Monitor**

**16K + Memory Expansion to 32K
from 4K to 64K Memory Expansion**

Books • Supplies

Printers • Modems • Accessories

Cassette and diskette products

Shipping from stock

Call or write:



COMPUTERWARE

6809 Specialists

Dept. C • Box 668

Encinitas, CA 92024 • (714) 436-3512

Computerware is a trademark of Computerware.

Q-2

FILE (From Page 58)

```

730 IF I$="P" THEN GOSUB 1190
740 IF I$="?" THEN GOSUB 1290
750 IF I$(">A") THEN 770 ELSE PRINT
NT
760 PRINT"SECTION TO BE ADDED:"
GOTO 350
770 PRINT @17,"SEARCHING FILE":G
OTO 560
780 SOUND 200,5:CLS0:PRINT@195,"
<no more data on file>":Z=USR
(0)
790 GOSUB 1150:GOTO 70
800 N$(X)="":PRINT STRING$(32,CH
R$(128));PRINT"ITEM DELETED FRO
M FILE"
810 SOUND150,1:PRINT"(STANDBY WH
ILE FILE IS UPDATED)"
820 FOR XX=X TO D-1
830 N$(XX)=N$(XX+1):NEXT XX
840 X=X-1
850 GOTO 560
860 IF TY=1 THEN GOSUB 3050
870 GOSUB 1170:FL$=I$
880 N=0
890 OPEN"I",#TY,I$
900 N=N+1
920 INPUT#TY,N$(N)
930 X=INSTR(N$(N),"J"):IF X=0 GO
TO 960
940 MID$(N$(N),X,1)=CHR$(13)
950 GOTO 930
960 IF EOF(TY)=0 THEN 900
970 CLOSE#TY
980 GOTO 70
990 PRINT@384,"do you want to sa
ve data (y/n)":X=USR(0)
991 I$=INKEY$:IF I$="" THEN 991
992 IF I$="N" THEN CLS:END
994 IF I$="Y" THEN PRINT @384,ST
RING$(32," "):GOTO1010
1000 GOTO 70
1010 GOSUB3000:GOSUB 1170
1030 N=0:IF TY=1 AND FL$=I$ THEN
CLS0:SOUND150,1:PRINT@7*32+5,"o
ld file being erased":X=USR(0):!
FL$+="/DAT"
1035 CLS0:SOUND150,1:PRINT@7*32+
5,"new file being created":X=USR
(0)
1036 X=0
1037 X=X+1:IF N$(X)<>"" THEN1037
1040 OPEN"O",#TY,I$
1050 N=N+1
1060 IF N$(N)="" THEN 1130
1070 Y=INSTR(N$(N),CHR$(13)):IF
Y=0 THEN 1100
1080 MID$(N$(N),Y,1)="J"
1090 GOTO 1070
1100 IF TY<>1 THEN 1115 ELSE ! #
1,N$(N)
1110 GOTO1050
1115 PRINT#-1,N$(N)
1120 GOTO 1050

```

```

1130 CLOSE#TY
1140 GOTO 70
1150 I$=INKEY$:IF I$="" THEN 115
0
1160 I=VAL(I$):RETURN
1170 PRINT:PRINT@448," file n
ame: ";
1171 Z=USR(0):PRINT " ";
1172 PRINT @463,";:LINE INPUT I
$
1175 IF I$="" THEN70
1180 Z=USR(0):RETURN
1190 CLS:GOSUB 1650:IF I=1 THEN
1220
1200 PRINT@230,"PRINTER IS NOT R
EADY":SOUND 100,5
1210 GOSUB 1150:GOTO580
1220 Y=INSTR(N$(X),"*"):IF Y=0 T
HEN 1260
1230 PRINT LEFT$(N$(X),Y-1):PRIN
T:PRINT#-2,LEFT$(N$(X),Y-1)
1240 PRINT#-2,"":PRINT#-2, STRIN
G$(32,"*")
1250 X=X+1:GOTO 1220
1260 PRINT N$(X):PRINT:PRINT#-2,
N$(X)
1270 PRINT#-2,"":PRINT#-2,STRING
$(32,"*")
1280 RETURN
1290 CLS(0):PRINT" key letters:"
1300 PRINT:PRINT " a = add dat
a"
1310 PRINT" c = correct data"
1320 PRINT" d = delete listing
"
1330 PRINT" s = stop search"
1340 PRINT" p = print data"
1350 PRINT" ? = prints this li
st"
1360 PRINT:PRINT " <space bar> c
ontinues search"
1370 X=X-1
1380 PRINT@480," <press any key
to continue>":Z=USR(0)
1390 IF INKEY$="" THEN 1390
1400 RETURN
1410 PRINT:PRINT"ENTER DATA TO B
E CHANGED:"
1420 LINE INPUT D1$
1430 D1=INSTR(N$(X),D1$)
1440 IF D1=0 THEN 1410
1450 PRINT"ENTER CORRECTED DATA:
"
1460 LINE INPUT D2$
1470 D2=LEN(D1$)
1480 C1$=LEFT$(N$(X),D1-1)
1490 C2$=MID$(N$(X),D1+D2)
1500 N$(X)=C1$+D2$+C2$
1510 IF I$="C" THEN X=X-1
1520 RETURN
1530 GOSUB 1650:IF I=1 GOTO 1560
1540 PRINT@485,"PRINTER IS NOT R
EADY";
1550 SOUND 150,5:FOR X=1TO500:N

```

```

XT X:GOTO70
1560 PRINT@483,"PRESS 'S' TO STO
P PRINTING";
1570 SOUND 100,5:FOR X=1 TO 500:
NEXT X
1580 X=0
1590 X=X+1: IF X=D+1 GOTO 1640
1600 IF N$(X)="" THEN 1640
1610 IF INKEY$="S" THEN 1640
1620 GOSUB 1190
1630 GOTO 1590
1640 GOTO 70
1650 REM***IS PRINTER READY?
1660 IF PEEK(65314)/2=INT(PEEK(6
5314)/2) THEN I=1 ELSE I=0
1670 RETURN
1680 REM **** SET CALENDAR***
1690 M$="JAN31FEB28MAR31APR30MAY
31JUN30JUL31AUG31SEP30OCT31NOV30
DEC31"
1700 Z=0:FOR Y=0 TO 11
1710 FOR X=1 TO VAL(MID$(M$,Y*5+
4,2))
1720 N$(X+Z)="J"+STR$(X)+ " "+MID
$(M$,Y*5+1,3)+ " 1981"
1730 NEXT X: Z=Z+X-1
1740 NEXT Y
1750 GOTO 70
1760 PRINT:PRINT:PRINT"data bein
g sorted, please wait":Z=USR(0)
1770 N=0
1780 N=N+1
1790 IF N$(N)<>"" THEN 1780
1800 REM***SORTING ROUTINE***
1810 FOR S1=1 TO N-1 STEP 2
1820 S2=S1+1
1830 NEXT S1
1840 S3=0
1850 S4=N
1860 S4=INT(S4/2)
1870 IF S4=0 GOTO 2060
1880 S3=S3+1
1890 PRINT @490,"PASS #":S3;
1900 FOR S5=1 TO S4-1
1910 S1=S5
1920 S2=S5+S4
1930 S6=0
1940 IF N$(S1)<N$(S2)GOTO 1990
1950 S6=1
1960 SS$=N$(S1)
1970 N$(S1)=N$(S2)
1980 N$(S2)=SS$
1990 S1=S2
2000 S2=S2+S4
2010 IF S2<N GOTO 1940
2020 IF S6=0 GOTO 2040
2030 GOTO 1910
2040 NEXT S5
2050 GOTO 1860
2060 GOTO 70
2070 FOR X=1 TO 5
2080 CSAVE"DATAFILE"
2090 FOR Y=1 TO 500:NEXT Y:NEXTX

```

(Continued on next page)

TWO LOWER CASE MODS BOTH OUTSTANDING

We hear a lot about the reverse video characters that signify lower case on the 80C's screen. At least two people have done something about them.

Lowercase modification kits change the "checkerboard" of reverse video into real lower case characters with real descenders -- those little tails on G's, J's and Y's that extend below the "line." Makes them more readable.

The modifications are made by MSB Electronics and Micro Technical Products. Both systems -- Micro Tech's LCA-47 and MSB's *NORD PROCESSING LOWERKIT*, do exactly as advertised: They create attractive true lower case on the 80C screen. Both work on the same principle and both are priced about the same (information at the end of review).

The LCA-47 and the *LOWERKIT* both make use of a feature of the 80C which uses a chip inside the cabinet to control the letters. Both use small circuit boards to enhance the output of the 80C's chip (called a VDG, or Video Display Generator). Both systems involve opening the 80C case (and voiding the 90-day warranty). But installation of each is simple, and can be done in only a few minutes. Both also have the capability of being controlled from outside the cabinet.

The *LOWERKIT*'s characters are designed like those of the Model I. They are somewhat the larger of the two character sets and are very easily seen from across the room. By contrast, the LCA-47 offers a slightly more compact character. It, too, is easily seen at a distance. The proof of the pudding here is probably in the asterisk -- and both give you a real asterisk, not just a black dot.

Both also give you a slash through the zero. Nice. It makes it a lot easier to distinguish between zeros and letter O's. That's the same reasoning we use in printing listings in the *RAINBOW*. And we think it helps.

One word of caution. Neither kit will be easy to install if you have one of the earliest 80C's. In those models, the VDG chip was soldered directly to the board. If you are going to get one of these -- open the case and see what the score is. Desoldering the chip is not easy and, unless you are very good at that sort of thing, don't try it. As an added caution, the LCA-47 will not work with Computerware's 32K upgrade. And, to Micro Tech's credit, they advertise that fact.

Besides the manner in which each of these products constructs letters, there isn't a whole lot of difference...except.

Micro Tech offers its board with two switches on top. You can use them to choose whether you want light letters on a dark background or dark letters on a light background. The reverse is particularly appealing on a black-and-white TV. You also have the ability to switch the lowercase off and on. You can set up the switches to operate from outside the cabinet.

The *LOWERKIT* offers an external switch as an additional feature. In addition, it adds a number of "different" graphic symbols (circles, squares and fine lines) which can be accessed by POKing them onto the screen.

Both products are first class, well made and worked as described.

(*NORD PROCESSING LOWERKIT*, marketed by Spectrum Projects, 93-15 86th Drive, Woodhaven, NY, 11421, \$79.95)
(LCA-47, Micro Technical Products Inc., 814 N. Keating Ave., Mesa, AZ, 85202, \$75)

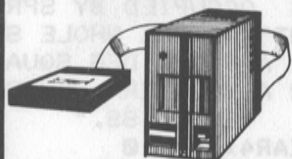
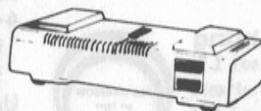
FILE (From Page 61)

```
3000 PRINT @132," device to be
used:"
3010 PRINT:PRINT"      d - dis
k"
3020 PRINT"      t - tape"
3030 IF I$="A" OR I$="ADD" THEN
PRINT"      k - keyboard"
3040 PRINT:PRINT@320,"      yo
ur choice?";:X=USR(0)
3041 I$=INKEY$:IF I$=""THEN3041
3042 IF I$="D" THEN TY=1 ELSE IF
I$="T" THEN TY=-1 ELSE IF I$="K
" THEN TY=3 ELSE IF I$=CHR$(13)
THEN 70 ELSE SOUND 50,2:GOTO3041
3045 RETURN
3050 GOSUB3500:PRINT" these are
the files contained in the dis
```

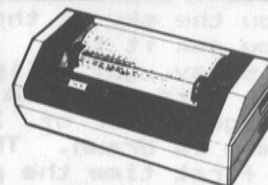
```
k at this time":Z=USR(0):FOR W=
3 TO 11
3060 DSKI$0.17,W,A$,B$
3070 C$=A$+LEFT$(B$,127)
3080 NAM$(0)=LEFT$(C$,8)
3090 EXT$(0)=MID$(C$,9,3)
3100 FOR Z=1 TO 7
3110 NAM$(Z)=MID$(C$,Z*32+1,8)
3120 EXT$(Z)=MID$(C$,9+Z*32,3)
3130 NEXT Z
3140 FOR ZZ=0 TO 7
3150 IF EXT$(ZZ)="DAT" AND LEFT$
(NAM$(ZZ),1)<>CHR$(0)THEN PRINT
"  "NAM$(ZZ),
3160 NEXT ZZ,W
3170 RETURN
3500 SOUND150,2:CLS(0):PRINT"
```

```
universal data file"
3510 PRINT"-----"
----"
3530 RETURN
4000 FOR I=0TO7:READ E$:E=VAL("&
H"+E$):POKE I+&HE03,E:NEXT
4010 DEFUSR0=&HE03:X=USR0(&HE018
):GOTO10
5000 PRINT@134,"a - add data"
5010 PRINT@166,"f - find item";
5020 PRINT@198,"p - print entire
file";
5030 PRINT@230,"s - sort data";
5040 PRINT@262,"e - exit to basi
c";
5050 X=USR(0):RETURN
-----
```

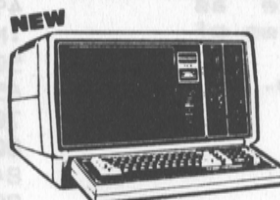
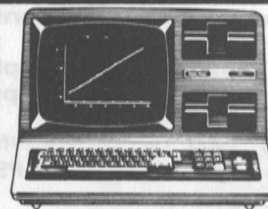

From Computer Plus to YOU...

PLUS after PLUS after PLUSColor Computer Disc Drive
\$470

32K Exp. Int. \$334



Line Printer VII \$315

Color Computer 4K \$310
w/16K Ext. Basic \$459
w/32K Ext. Basic \$525Model 16 128K
1 Drive \$4299Model III 16K \$839
Model III 48K
2 Disc & RS232C \$2059**BUY DIRECT** Here are just a few of our fine offers ...
call TOLL FREE for full information.**COMPUTERS**

Model II 64K	\$3300
Model III 4K LEV I	599
MODEL III 16K	839
MODEL III 32K	945.50
*MODEL III 32K	881.50
MODEL III 48K	1052
*MODEL III 48K	924
Model III 48K	
2 Disc & RS232 c	2059
†Model III 48K	
2 Disk No RS232 c	1799
Color Computer 4K	310
Color Computer 16K	
w/extended basic	459
Color Computer 32K	
w/extended basic	525
‡Color Computer 32K-64K	
w/extended basic	489
Pocket Computer 2	230
Model 16 1DR 128K	4299
Model 16 2DR 128K	4999

PERIPHERALS

*Expansion Interface 32K	334
16K RAM N.E.C. 200 N.S. chips	25
DT-1 Data Terminal	599
64K Ram Chips	75

MODEMS

Lynx Direct Connect MI/MIII	235
Auto Ans./Dial	
Telephone Interface II	169
R.S. Modem I D.C.	130
R.S. Modem II D.C.	210

PRINTERS

Daisy Wheel II	1695
Epson MX80	479
Epson MX80 FT	589
Epson MX100	759
Line Printer VII	315
Line Printer VIII	620
Line Printer V	1610
Microline 80	345
Microline 82A	479
Microline 83A	735

Microline 84 Parallel	1090
P. C. Plotter Printer	199

DISK DRIVES

R.S. Model III 1ST-Drive	712
Traxx Tanoon 40 Track MI	289
R.S. 1 Drive Exp MII	999
Color Computer Drive 0	470
Primary Hard Disk	3999

SOFTWARE

R.S. Software 10% off list	
Newdos 80 MIII	149
Color Computer Flex D.O.S.	99

ETC.

Verbatim 5" Double Density	32
Verbatim 8" Data Life	49.95
Ctr-80A recorder	52
C. C Joysticks	22

*Computer Plus New Equipment,
with NEC RAM installed.
180 Day Computer Plus Warranty.
†MIII R.S. Drive 0 Tandon Drive 1
‡Color Computer 64K requires
Disk 0 and Flex D.O.S.

Call TOLL FREE 1-800-343-8124

We have the lowest possible
Fully Warranted Prices AND
a full complement of Radio Shack
Software.

DEALER INQUIRIES ARE INVITED

Prices subject to change without notice.
Not responsible for typographical errors.
TRS-80 is a registered trademark of Tandy Corp.



**computer
plus**

245A Great Road
Littleton, MA 01460
617-486-3193

Write for your
free catalog

STARS FALL ON 80C

This neat little program from Ray Moses of Moses Engineering will give you a display of the sky using a variety of times of the year.

The program, as it is listed below, explains what inputs have to be made and how to make them. Once those inputs are made, STARNAP will show you the sky at the time of year that you ask it to.

Some 80C's may get slightly hung up running this program and will display a large number of lines when the star map is drawn. This usually happens the first time the program is run, but can happen other times, too. If it happens to you, just BREAK the program and RUN it again. That should clear things up.

There are several options here as to display of the sky in terms of time of the year and hemisphere.

We hope you enjoy this program.

```
1 PCLS0:SCREEN1,1
2 FOR N=1 TO 10:LINE(128+2*N*COS
(N),N*SIN(N)+90)-(128,90),PSET
3 SCREEN1,1:NEXT N
4 FOR T=1 TO 200:NEXT T
10 CLS(3)
20 PRINT@160," MOSES ENGINEERIN
G PRESENTS COMPUTERIZED
STAR MAP"
```

16K
ECB

```
30 FOR T=1 TO 3000:NEXT T
40 PRINT"IN THE FALL HOUR 0 IS O
PPOSITE THE SUN. IN THE WINTER
6, IN THESPRING 12, IN THE SUMME
R 18. THIS MAP HAS 0(FALL) ON
THE LEFT. WINTER COMES NEXT
. SUMMER "
```

```
42 PRINT"SKIES ARE TO THE RIGHT
OF THE SCREEN. YOUR CENTER SC
REEN IS OCCUPIED BY SPRING."
```

```
44 PRINT"FOR THE WHOLE SKY ENTER
W, FOR A 90X90 DEG SQUARE ENTER
S. FOR A SOUTHERN HEMISPHERE SQ
UARE ENTER SS."
```

```
45 PCLEAR4:CC=-10
```

```
46 INPUT M$
```

```
47 IF M$="W" THEN 50
```

```
48 INPUT"ENTER THE HOUR OF THE C
ENTER OF THE SQUARE";CC
```

```
49 PCLS0:SCREEN1,1:FOR T=1 TO 40
:NEXT T
```

```
50 PCLS3
```

```
65 PMODE3,1
```

```
70 COLOR1,0
```

```
80 LINE(240,0)-(240,191),PSET
```

```
84 PAINT(250,10),4,1
```

```
90 DRAW"BM250,20L5D5R5D5L5BD10R5
L3D10BL2BD10ND10R5D5ND5NL5L5BD15
ND10R5D5L5F6BD20ND10G3H3D10BD10N
D10R5D5NL5D5BL5BD10ND10R5D5L5"
```

```
100 SCREEN1,0
```

WHAT IS THE SOLUTION ?

```
OK
LIST
10 'Demo of the SOLUTION - Snake Mountain
Software (screen print of display)
20 FOR X=1 TO 30 STEP 4
30 CIRCLE(200,96),X,0
40 NEXT X
50 FORX=32 TO 127
60 PRINTCHR$(X);";":NEXTX
```

OK

RUN

```
1 " # $ % & ' ( ) * + , - . / 0 1 2 3 4
5 6 7 8 9 : ; < = > ? @ A B C D E F G H I
J K L M N O P Q R S T U V W X Y Z [ \ ] ^ _
+ ' a b c d e f g h i j k l m n o p q r s
t u v w x y z { | } ~
```



One of the major complaints about the Color Computer is the small screen size and the reverse upper case to represent lower case. The SOLUTION was developed to fix these problems. It is written in machine language, hence it is fast. It provides a screen of 42 characters per line, with 21 lines displayed. All the characters are in a 5X8 matrix and are very readable. The program even provides true lower case characters with decenders.

The SOLUTION is linked to Basic so all PRINT and LIST commands work normally. The SOLUTION uses the high resolution graphic mode, and graphics may be intermixed with text. Others features include:

- 1) double size character mode with 10 lines for small children or the visually impaired
- 2) ability to reverse all characters
- 3) a mode which allows for 4 lines of text at the bottom of a PMODE 4 graphic screen (just like some other famous computers)
- 4) the program is fast-it will print at over 500 characters per second-----The price of this is only \$12.95 +\$1.00 for shipping.

Special this month-order the SOLUTION and for \$1.00 get a screen print program-works with all graphic modes,is relocatable, print anywhere on a page, works with the SOLUTION

SNAKE MOUNTAIN SOFTWARE,P.O. BOX 5722,RALEIGH, NC 27650




```

110 PAINT(20,20),3,1
115 FOR N=1 TO 300
120 READ H,D,M
125 IF H=25 THEN 1000
130 IF M=1 THEN B=2
140 IF M=2 THEN B=1
150 IF M=3 THEN B=4
154 IF CC=-10 THEN GOSUB 2000
160 IF CC<>-10 THEN GOSUB 3000
170 SCREEN1,0
200 DATA 6.7,-16,1,6.3,-52,1,14.
6,-61,1,18.6,39,1,14.2,19,1,5.2,
-8,1,5.2,46,1,7.6,5,1,1.6,-57,1,
14,-60,1,19.8,9,1,4.6,16,1,12.4,
-63,1
210 DATA 16.4,-26,1,5.9,7,1,13.3
,-11,1,7.7,28,1,22.9,-30,1,20.7,
45,1,12.7,-59,1,10.1,12,1,7.5,32
,2,2,89,2
220 DATA 11,62,2,14.9,74,2,21.3,
62,2,.9,61,2,2,42,2,2.1,23,2,1.9
,21,2,1.1,35,2,1.3,60,3,.6,56,2,
.1,59,2,.1,29,2,.7,-18,2,.4,-43,
2,23,28,2,23.1,15,2,1.2,15,3,22.
7,47,2,22.1,-47,2,21.7,10,2
230 DATA 2,42,2,2.1,23,2,3.1,41,
2,3.3,50,2,3.9,33,3,5.9,45,2,5.9
,37,2,5.3,28,2,3.7,27,3,4.4,19,3
,5.3,7,2,5.6,-3,2,5.5,-2,2,5.4,-
1,2,5.7,-10,2,6.6,17,2,6.3,-18,2
,7.1,-27,2,7.3,-29,2,6.3,22,3,6.
6,24,3,7.3,22,3
240 DATA 8.3,-59,2,8.7,-54,2,8.1
,-47,2,8,-40,2,9.4,-8,2,11,56,2,
10.2,20,2,11.8,15,2,11.2,21,2,11
.9,53,2,12.2,57,3,12.9,56,2,12.2
,-17,2,12.6,-48,2,13.7,-53,2,13.
7,50,2,13.3,55,2,14.7,28,2,14.1,
-37,2,14.6,-42,2
242 DATA 15.9,-22,2,15.2,-9,2,15

```

```

.7,7,2,15.6,27,2,14.5,38,3,15,40
,3,15.2,34,3,16.6,-10,2,16.1,-20
,2,15.9,-26,3,16.3,-25,3,16.6,-2
8,3,16.7,-33,2,16.7,-38,2,17.6,-
43,2,17.7,-39,2,17.1,-16,2,17.5,
-37,2
244 DATA 17.5,13,2,17.9,52,2,18.
7,33,3,19,32,3,18,-30,3,18.3,-35
,2,18.3,-30,3,18.4,-25,3,18.7,-2
7,3,18.8,-26,2,19,-30,2,19.1,-28
,3,19.7,35,3,20.3,40,2,20.7,34,2
,19.5,38,3,20.3,-57,2,21.7,10,2,
9.2,70,2,14.7,69,2
260 DATA 25,25,25
950 NEXT N
1000 SCREEN1,0
1005 RESTORE
1010 GOTO 1000
2000 REM
2400 PSET(240-10*H,-D+90,B)
2450 SCREEN1,0
2500 RETURN
3000 IF M$="SS" THEN 4000
3005 IF D>70 THEN RETURN
3100 REM
3110 IF D<-20 THEN RETURN
3210 IF H<CC-18 THEN H=H+24
3220 IF H>CC+18 THEN H=H-24
3232 IF H>CC+6 THEN RETURN
3234 IF H<CC-6 THEN RETURN
3240 PSET(120-20*(H-CC),-2*(D+20
)+180,B)
3300 SCREEN1,0
3500 RETURN
4000 IF D>0 THEN RETURN
4210 IF H<CC-18 THEN H=H+24
4220 IF H>CC+18 THEN H=H-24
4232 IF H>CC+6 THEN RETURN
4234 IF H<CC-6 THEN RETURN
4240 PSET(120-20*(H-CC),-2*(D+90
)+180,B)
4300 SCREEN1,0
4500 RETURN

```



TIRED OF TYPING IN RAINBOW PROGRAMS?



Now, you can get RAINBOW ON TAPE and stop bruising your fingers each month just to run a great program you want! RAINBOW ON TAPE offers all the major listings from the RAINBOW each month. And, you'll be able to simply put the cassette in your tape recorder, CLOAD and RUN them! No more typing. And no more debugging your typing mistakes!

RAINBOW ON TAPE is available for \$5 per single issue (please specify month) or for \$50 for a year (12 tapes). VISA and MasterCard accepted! To start RAINBOW ON TAPE coming by first class mail, just fill in the order form below.

the RAINBOW
5803 Timber Ridge Drive
P.O. Box 209
Prospect, KY 40059

YES! Sign me up for RAINBOW ON TAPE! I would like:

___ A Full Year For \$50

___ A Month For \$5 (Please show month) ___

Name _____

Address _____

City _____

State _____

Zip _____

☐ Payment Enclosed

☐ Charge my VISA account # _____

Charge my MasterCard Account # _____

Signature _____

Card Expiration Date _____ Interbank # _____



Software Review...

**BLACKJAK IS A
FINE 4K GAME**

We can easily say some very nice things about **BLACKJAK** from Rainbow Connection Software (3514 6th Place NW, Rochester, MN, 55901, \$11.95 with **MATH TUTOR** on a twinpack cassette - \$2 discount for RAINBOW subscribers).

Without using any graphics whatsoever, Rainbow Connection does give you cards (by blacking the screen except where the cards are displayed) and makes the playing of the game simple and enjoyable. And, for those of us who can't add, it totals up the points as well.

That all of this is done in only 4K, including the maintenance of the card deck arrays, is quite something. The game also keeps track of three players' winnings and losings, and allows the surviving player(s) to keep on even when someone goes broke.

The flip side of the tape, **MATH TUTOR** is a bonus but nothing particularly special. It is your standard add, subtract, multiply and divide drill but does let you decide how high the numbers should be and keeps up with the right and wrong answers.

MATH TUTOR does the job ably and well, but with no particular flair. **BLACKJAK**, on the other hand, is quite a programming accomplishment for 4K and fun to play, too.

Tip...

SPEED UP YOUR DISK

A letter in our March issue reported on a way you might be able to make your 80C work with the POKE speedup even if you have the "slow" chips. But it didn't solve the problem of making your disk operate at the faster speed.

If you remove capacitor 85 -- in addition to 73 and 75 which may let you operate at the faster speed without a disk -- the disk I/O should work all right.

You should note that you will void your warranty if you open the computer case. And, you should be aware that this is but one possible solution.

Read the letter in the March issue for further details.

Look for
the...

**HARMONYCS**

P.O. BOX 1573
SALT LAKE CITY, UTAH
84110-1573

GAME SET I (4K) \$7.95

Three games on one cassette. **FRENZY** a vocabulary building word game. **MASTER CODE** is like Master Mind (tm). **SEVEN-ELEVEN** is a dice game of skill and chance.

MONEY MINDER II (16K) \$8.95

Money Minder II is a cassette based personal finance program. Up to 56 user definable budget categories. Printout capability. Menu driven-easy to use. (4K version available - \$7.95)

PRESCHOOL PAK (16K EXTENDED BASIC) \$6.95

Two preschooler learning games on one cassette. Makes use of hi-resolution graphics and sound. The kids think it's a fun game. (it is!)

COLORHYTHM (16K EXTENDED BASIC) \$9.95

Biorhythms for the Color Computer. Excellent use of hi-res graphics. Plots your 15 day biorhythms.

SISI (16K EXTENDED BASIC) \$9.95

Sisi-the fortune telling computer uses data that you input to determine a character reading for you. You might be surprised!

TEE-SHIRT \$7.95

Sizes S,M,L, XL. Please specify. (Allow 3 to 6 weeks for delivery) Also specify red or blue on white tee-shirt.

All programs supplied on cassette and shipped post-paid. Foreign orders please adjust prices for exchange rate to U.S. dollars. Sorry, no COD.



COMPUTER GAMES

TRS-80 MODEL 1/3 16K LEVEL II
TRS-80 16K COLOR AND 8K PET

DEMONSTRATION PROGRAM "FROG RACE" COMES ON CASSETTE WITH A FULL REFUND COUPON TO USE ON YOUR NEXT ORDER.
FROG RACE CASSETTE \$3. WITH CATALOG

DUO-PAK'S ARE \$10 DOLLARS EACH.

- | | | | | |
|-----|-----------------|-----------------|-----|--------|
| NO. | PGM | SIDE 1 | PGM | SIDE 2 |
| 1 | GONE FISHING | CONCENTRATION | | |
| 2 | CRAPS | SLOT-MACHINE | | |
| 3 | STARSHIP | SHERLOCK HOLMES | | |
| 4 | TANK ATTACK | ASSOCIATION | | |
| 5 | NUMBER GUESS | DICE ROLL | | |
| 6 | IN-BETWEEN | SHELL GAME | | |
| 7 | SAFARI | STARSHIP-2 | | |
| 8 | MORTAR BATTLE | PUZZLE | | |
| 9 | TEASER | MOUSE | | |
| 10 | PT BOAT | TURTLE RACE | | |
| 11 | CHEK-CHES | STARSHIP-3 | | |
| 12 | THINK | LUCK & LOGIC | | |
| 13 | TREASURE ISLAND | RESCUE | | |
- SHIPPED 1ST CLASS MAIL PPD. - NO COD'S.
SPECIFY WHAT COMPUTER YOU HAVE.
B. ERICKSON P.O. BOX 11099
CHICAGO, IL 60611

INDEX TO ADVERTISERS

Aardvark 80.....48
 Armadillo International Software.....23
 B. Erickson.....66
 Century Software.....11
 Cer-Comp.....17, 24
 Chromasette.....8C
 Cliff's Color Corner.....67
 Cognitec.....59
 Color Software Services.....9
 Computer Island.....52
 Computer Plus.....63
 Computerware.....60
 Custom Software Engineering.....13
 DSL Computer Products.....47
 East Texas Color Computer Club.....17
 Endicott Software.....45
 80-U.S. Journal.....19
 Elite Software.....46
 Great XPT.....22
 Harmonycs.....66
 Hogg, Frank Laboratory.....41
 Illustrated Memory Banks.....43
 JARB Software.....6

Land Systems.....28
 Mark Data Products.....30
 Martin Consulting.....38
 Micro-80.....40
 Micro Technical Products.....26
 Tom Mix Software.....36
 Moses Engineering.....52
 Nanos Systems Corp.....53
 Nelson Software.....55
 Peacock Enterprises.....58
 Prickly-Pear Software.....20
 Quasar Animations.....51
 Rainbow Connection Software.....29
 Rainbow On Tape.....65
 68 Micro Journal.....54
 Snake Mountain Software.....3, 64
 Soft Sector Marketing.....56
 Spectral Associates.....33
 Spectrum Projects.....34, 35
 Star Kits.....37
 Sugar Software.....14
 Superior Graphic Software.....10
 Teague Programming.....50
 Transformation Technologies.....44

An Amazing Offer. . .

Now Available!
 * 32K

TRS-80* COLOR COMPUTER

* Extended Color Basic

* 1.1 ROM

* 'E' Board

* Full 90-Day Warranty

For ONLY... **\$524**

Send check, Money Order, Visa or MasterCard Number to:

CLIFF'S COLOR CORNER
 Rt. 4, Box 248
 Floyd's Knobs, IN 47119
 *Trademark, Tandy Corp.

The RAINBOW

5803 Timber Ridge Dr.
 Prospect, KY 40059

Gentlemen:

YES! Sign me up for a one-year (12 issues) subscription to the RAINBOW.

Name _____

Address _____

City _____ State _____ Zip _____

☐ Payment enclosed

☐ Charge my VISA Account # _____ ☐ Charge my MasterCard Account # _____

Signature _____ Card Expiration Date _____ INTERBANK # _____

Subscriptions to the RAINBOW are \$16 per year in the United States. Canadian and Mexican rates are \$22 per year. Surface mail to other countries is \$31, air mail to other countries is \$49. Non-U.S. rates are higher due to postage costs alone. Payment accepted in U.S. funds.

Limited back issues are available for \$2 each for issues 1-7, \$2.50 each for issues 8 and upward. Shipping and handling costs of \$2.50 per order must be added.

Has your TRS-80 Color Computer READ A GOOD TAPE LATELY?

Trying to educate your CoCo can be a trying experience. Pounding on the keyboard is not the positive reinforcement your computer needs. **CHROMASETTE** Magazine is the civilized way to introduce your computer to the world of good software.

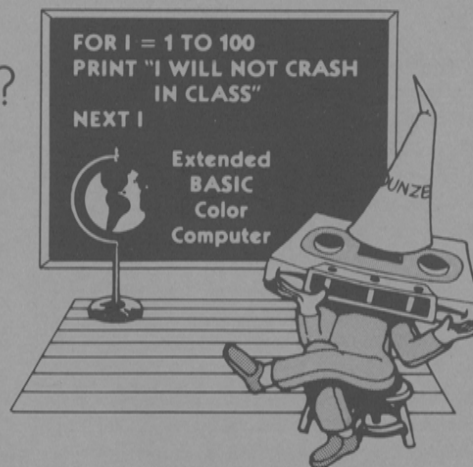
With **CHROMASETTE** Magazine, CoCo gets both quantity and quality. Every month, 6 to 8 programs arrive by First Class Mail. No need to type them in — **CHROMASETTE** Magazine is a cassette tape with educational, practical, utility, and game programs on it. Just load and run. Ah, the life of luxury! Give your computer a cultural lesson.

Get a subscription to **CHROMASETTE** Magazine.

The Bottom Line:

1 year (12 issues) \$45.00
6 months (6 issues) \$25.00
Single copies \$5.00
Calif. residents add 6% to single copies.
Overseas — add \$10 to subscriptions, and \$1 to single copies. Sent AO rate.

The Fine Print: Issues are sent First Class Mail. All issues from July 81 on available — ask for list. Programs are for the Extended BASIC model only.
TRS-80 is a trademark of Tandy Corp. MasterCard/Visa/Gold also welcome



Chromasette Magazine

P.O. Box 1087 Santa Barbara, CA 93102 (805) 963-1066

the RAINBOW

5803 Timber Ridge Drive • Prospect, KY 40059

The Monthly Magazine for Color Computer Users

Bulk Rate
U.S. Postage
Paid
Prospect, KY
Permit No. 18

ADDRESS CORRECTION REQUESTED